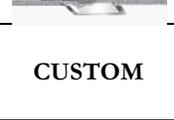
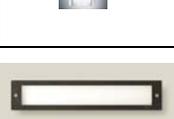


Appendix

- Appendix A - Luminaires
- Appendix B - Lamps
- Appendix C - Lighting Controls
- Appendix D - Backup Generator
- Appendix E - Luminaire Cutsheets
- Appendix F - Photovoltaic Panels
- Appendix G - Overcurrent Protection Device
- Appendix H - Water Harvest System
- Appendix I - Lighting & Electrical Drawings

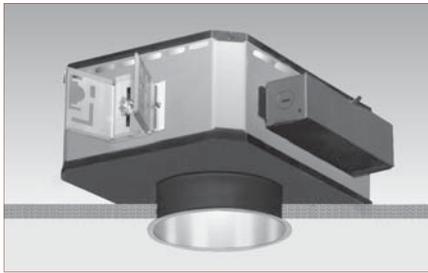
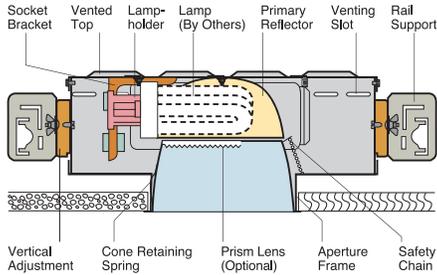
Appendix A - Luminaires

Lighting Fixture Schedule								
Image	Type	Manufacture	Fixture Description	Watt	Quantity	Lamp	Ballast	Model
	L1A	Kurt Versen P921	Recessed compact fluorescent wallwasher	36	27	CF32DT/E/IN/835/ECO Osram Sylvania	Advance IDL-2S26-M5-BS	P921
	L1B	Kurt Versen Downlight	Two reflector optical system for wide distribution	52	12	CF32DT/E/IN/835/ECO Osram Sylvania	Advance ICF-2S42-M2-LD@230	P949
	L1C	Kurt Versen Downlight	Recessed compact fluorescent downlight	36	5	CF32DT/E/IN/835/ECO Osram Sylvania	Advance IDL-2S26-M5-BS	P926
	L2A	Selux M100	Recessed linear fluorescent wall washer	39	7	FP28/835/ECO Osram Sylvania	LUTRON ECO-T528-277-1	M1A-1T5-AMP-PM-004-SV-277-X
	L2B	Selux M100 Super Recessed	Recessed linear fluorescent wall washer	31	27	FP28/835/ECO Osram Sylvania	Advance ICN-2S28-N@120	M1B1S-1T5-SD-PM-68-SV-277
	L3	Litecontrol Wall/Slot-2000	Recessed perimeter fixture	36	16	FP28/835/ECO Osram Sylvania	LUTRON ECO-T528-277-1	#14716000
	L4	Selux M60	Recessed linear fluorescent	39	22	FP28/835/ECO Osram Sylvania	Lutron Eco-10	M6R1-1T5-MA-PM-004-SV-277
	L5A	Kurt Versen H8632	Recessed compact fluorescent downlight	36	34	CF32DT/E/IN/835/ECO Osram Sylvania	Advance IDL-2S26-M5-BS	H8632
	L5B	Kurt Versen H8653	Recessed compact fluorescent wallwasher	36	4	CF32DT/E/IN/835/ECO Osram Sylvania	Advance IDL-2S26-M5-BS	H8653
CUSTOM	L6	Custom Luminaire	Decorative Pendant	27	3	FP24/835/HO/ECO Osram Sylvania	Advance ICN-2S24@120V	Custom
	L7	Electrix Adjustable Linear Fluorescent	Linear Cove System	39	39	FP28/835/ECO Osram Sylvania	Lutron Eco-10	AX-28-S1-U-D3-156
	L8	Schmitz Public	Surface compact fluorescent sconce	46	4	CF42DT/E/IN/835/ECO Osram Sylvania	Advance ICF-2S26-H1-LD@120	16991.06/2830
	L9	Bega Step light	Recessed wall luminaire	16	30	CF13DD/835/ECO	Advance H-1B13-TP-BLS	2287P

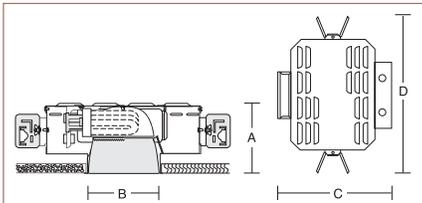
Appendix A - Luminaires

	L10	iO Luxrail	LED handrail	2.1	48	LED	Driver	06-CAA-1-WM-NR-45-3kHO-80-277v
	L11	Bega Recessed wall luminaire	Recessed wall luminaire with unshielded light	27	22	CF26DT/E/IN/835/ECO Osram Sylvania	Advance RCF-2S26-H1-LD-QS	2850P
	L12	Erco Tesis In-ground luminaire	Lens wallwasher for metal halide lamps	45	7	MC39TC/U/G8.5/830PB Osram Sylvania	Advance RMH-39-K	33715.023
	L13	Louis Poulsen Nimbus LED	Inground accent and marker illumination	9	6	LED	Driver	NIM-PWR-9 LED White - 277V - ST STEEL-ANTI-SLIP-STRAIGHT - W/SLEEVE
	L14	Selux Ritorno Round Symmetrical	Pole top luminaires with for indirect architectural lighting	80	8	MC70T6/U/G12/930PB Osram Sylvania	Advance IMH-70-J	RRS-1-H070T6-SV-277-RP9
	L15	B-K Lighting McKinley Series (PAR20)	Adjustable outdoor lighting system	50	18	50PAR20/HAL/NFL30 Osram Sylvania	-	-
	L16	Erco Cylinder Façade luminaire	Direct/indirect lighting for metal halide lamps	26	21	MC20TC/U/G8.5/830PB	Advance RMH-20-K	85026.023
	L17	Daifuku Designs Lite Cube	Light-seats in white polyethylene	13	4	CF19EL/SUPER/850BL Osram Sylvania	Integral Ballast	Lite Cube
	L18	iLight Technologies Plexineon White 1X Series	Accent lighting solution with LED technology designed to be used straight or bent	100W per 32 ft	104	LED	Driver	T-24-W45-S-1040SC00
	L19	Color Kinetics eW Cove Powercore	Linear cove System	4.5	19	LED	Driver	523-000004-00-910403600103
	L21	Lightolier Vetro Downlight	Architectural Decorative Vetro Downlight	50	9	50MR16/IR/FL35/C Osram Sylvania	-	-
	L22	io line 1.5	Led based linear flood	28	18	LED	Driver	series 1.5

Type: L1A



Dimensions and Lamps



Number	A Depth	B Aperture	C Width	D Length	Lamps
P921	6 1/8" / 156mm	5 1/8" / 149mm	13 1/2" / 343mm	19" / 483mm	26-32W Triple Tube
P922	6 1/8" / 156mm	5 1/8" / 149mm	13 1/2" / 343mm	19" / 483mm	42W Triple Tube

Brightness

Number	Lamps	Plane	Beam Angle				
			85°	75°	65°	55°	45°
P921	One 32W Philips Triple Tube	0°	11	37	64	5249	13556
		90°	9	32	54	12138	15412
	One 32W Osram Sylvania Triple Tube	0°	8	33	55	3019	13550
		90°	7	32	53	10505	13987
P922	One 42W Philips Triple Tube	0°	12	34	62	5559	14282
		90°	11	41	68	11342	15425
	One 42W Osram Sylvania Triple Tube	0°	11	44	73	3068	15813
		90°	11	47	76	14354	18396

Data in footlamberts. Photometer readings, Maximum Brightness Method. See note 7 on the other side.

P921 One 26W or 32W Triple Tube Lamp

P922 One 42W Triple Tube Lamp

P52

Medium-Wide Beam
5 7/8" Conoid Apertures

Optics and Applications

Ellipsoidal primary reflectors and parabolic shielding cones produce classic symmetrical patterns for general use in corridors, open areas and transient spaces. Recess depths are shallow for limited plenums. Use in medium ceiling heights. Spacing criteria from 1.14 to 1.23.

Design Features

Fixtures accept Philips, Osram Sylvania, GE or other compatible lamps despite the variance in lamp base dimensions. Construction allows easy access to all components. Air flow design lowers fixture temperature for optimal lamp performance. Steel housings protect the reflectors and assure their proper relationship. Maximum ceiling thickness 1 5/8". Ballast and lamp service from below.

Finish

Specular clear Alzak cones are standard. Optional colors and Softglow® finishes are available. Housings and structural parts are painted optical matte black to suppress stray light leaks. Steel parts are phosphate conditioned for corrosion resistance before painting.

Ballasts

Fully electronic, microprocessor controlled with variable starting current for inrush protection to assure rated lamp life. Input voltage ranges from 120V through 277V. Operates multiple wattage interchangeably. Power factor .98, starting temperature 0° F (-18° C), THD < 10%. Pre-heat start < 1.0 second. End of lamp life protection. Rated for > 50,000 starts.

General

Fixtures are pre-wired, UL and C-UL listed for eight wire 75°C branch circuit wiring. Union made IBEW. Luminaire Efficiency Rating (LER) data is in the photometric directory located in Section Z.

Accessories

- F Fuse.
- G Gold cone.
- H Mocha cone.
- P Graphite cone.
- T Titanium cone.
- W Wheat cone.
- Y Pewter cone.
- Z Bronze cone.
- R2 26" support rails.
- R5 52" support rails.
- WT White trim flange.
- WHT White complete trim.
- V347 347 volt ballast.
- LS Lamp shield, acrylic.
- LP Prism lens, acrylic.

S Softglow® finishes: add S before color letters. e.g. SW for Softglow® wheat cone, SC for Softglow® clear cone.

DM Dimming ballast. Specify watts and volts.

EM Emergency power includes integral charger light and test switch visible through aperture. Single lamp operation for 90 minutes. Specify volts.

WRL Wattage restriction label, specify wattage.

Matching Units

Medium beam

Wall washers

Page P51

Pages P61, P62, P63



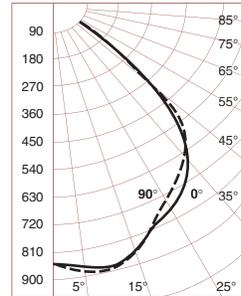
Type: L1A

52 P921 P922

Performance Datachart

Single Unit Initial Footcandles, 30° Work Plane				Ceiling to Floor				Multiple Units Initial Footcandles, 30° Work Plane			
P921 One 32W Philips Triple Tube Read Top Data				8'				Ceiling 80% Walls 50% Floor 20%			
P922 One 42W Philips Triple Tube Read Bottom Data								Spacing is Maximum Over Work Plane			
Nadir	15°	25°	35°	9'				Spacing	RCR 1	RCR 3	RCR 8
FC	FC Diam	FC Diam	FC Diam					Spacing	RCR 1	RCR 3	RCR 8
29	25 3'	19 5'	12 8'	10'				7'	35	29	19
36	32 3'	23 5'	14 8'					6'	47	39	26
21	18 3'	13 6'	9 9'	11'				8'	25	21	14
26	23 3'	17 6'	10 9'					8'	34	28	19
15	14 4'	10 7'	6 11'	12'				9'	19	15	10
19	17 4'	12 7'	8 11'					9'	25	21	14
12	11 5'	8 8'	5 12'	12'				10'	15	12	8
15	14 5'	10 8'	6 12'					10'	20	16	11
10	9 5'	6 9'	4 13'	12'				11'	12	10	6
12	11 5'	8 9'	5 13'					11'	16	13	9

Candlepower Distribution

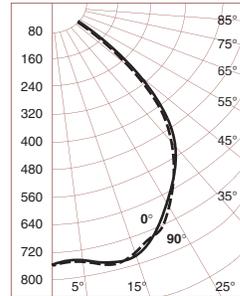


P921 One 32W Triple Tube Philips
Eff. 59% S/M 0° 1.23 S/M 90° 1.20

Candelas

o	0°		90°	
	2400*	2400*	2400*	2400*
0	869	869	869	869
5	881	884	884	884
10	886	887	887	887
15	846	854	854	854
20	807	791	791	791
25	780	729	729	729
30	725	703	703	703
35	672	641	641	641
40	559	564	564	564
45	350	366	366	366
50	129	159	159	159
55	48	68	68	68
60	11	12	12	12
65	3	4	4	4
70	0	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

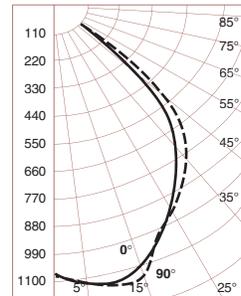
o Vertical Angles
* Initial Lamp Lumens



P921 One 32W Triple Tube Osram Sylvania
Eff. 49% S/M 0° 1.20 S/M 90° 1.15

o	0°		90°	
	2400*	2400*	2400*	2400*
0	770	770	770	770
5	776	764	764	764
10	786	772	772	772
15	781	780	780	780
20	725	719	719	719
25	682	692	692	692
30	626	595	595	595
35	572	527	527	527
40	450	433	433	433
45	253	270	270	270
50	112	132	132	132
55	45	54	54	54
60	9	9	9	9
65	2	2	2	2
70	0	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

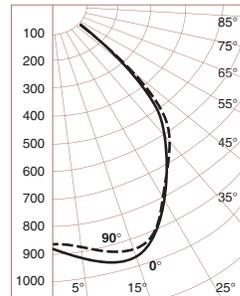
o Vertical Angles
* Initial Lamp Lumens



P922 One 42W Triple Tube Philips
Eff. 54% S/M 0° 1.14 S/M 90° 1.18

o	0°		90°	
	3200*	3200*	3200*	3200*
0	1085	1085	1085	1085
5	1107	1112	1112	1112
10	1092	1143	1143	1143
15	1027	1138	1138	1138
20	956	994	994	994
25	899	949	949	949
30	821	859	859	859
35	755	792	792	792
40	627	687	687	687
45	392	467	467	467
50	100	217	217	217
55	31	79	79	79
60	6	15	15	15
65	4	8	8	8
70	0	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

o Vertical Angles
* Initial Lamp Lumens



P922 One 42W Triple Tube Osram Sylvania
Eff. 45% S/M 0° 1.19 S/M 90° 1.19

o	0°		90°	
	3200*	3200*	3200*	3200*
0	887	887	887	887
5	913	889	889	889
10	939	922	922	922
15	944	934	934	934
20	918	910	910	910
25	816	808	808	808
30	722	715	715	715
35	619	641	641	641
40	497	553	553	553
45	287	338	338	338
50	97	168	168	168
55	30	73	73	73
60	8	10	10	10
65	0	0	0	0
70	0	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

o Vertical Angles
* Initial Lamp Lumens

Notes

- Data on all charts calculated with a clear specular cone finish.
- Specular cone multipliers: Gold x .98, Wheat x .97, Pewter x .86, Mocha x .86, Graphite x .83, Titanium x .83, Bronze x .80.
- Softglow® cone multipliers: Gold x .89, Wheat x .87, Pewter x .73, Mocha x .75, Graphite x .70, Titanium x .70, Bronze x .68.
- Single unit Datachart pattern diameters are determined by the number of degrees from each side of nadir. Therefore a 20° diameter represents a total 40° pattern width at the work plane 30" above the floor. Footcandle values are at the edge of that diameter.
- Datachart spacing is rounded off to the nearest foot.
- Data by IES methods. Compact fluorescent data vary due to lamp lumen differences, power input, burning position, ambient temperature and ballast characteristics. A modification factor should be applied.
- Brightness data from the Average Luminance Method are inaccurate for small aperture downlights. They are theoretical calculations derived for large surfaces such as troffers. For a complete discussion refer to section Z brochure Z1.

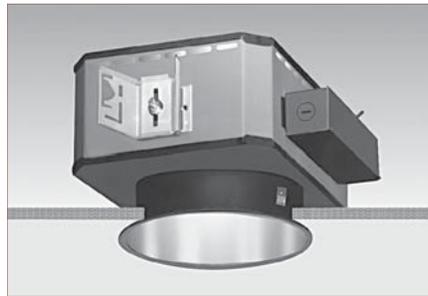
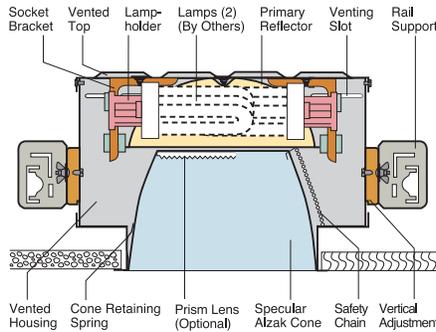
Coefficients of Utilization

Ceiling	80%				70%				50%				30%				0
Wall %	70	50	30	10	50	10	50	10	50	10	50	10	50	10	50	10	0
RCR	Zonal Cavity Method - Floor Reflectance 20%																
1	.67	.65	.63	.61	.63	.60	.61	.59	.59	.57	.54	.54	.54	.51	.49	.44	
2	.63	.59	.56	.54	.58	.53	.56	.52	.47	.50	.46	.44	.44	.41	.37	.36	
3	.59	.54	.51	.48	.53	.48	.52	.47	.42	.46	.41	.40	.40	.37	.34	.33	
4	.55	.50	.46	.43	.49	.42	.47	.42	.42	.46	.41	.40	.40	.37	.34	.33	
5	.51	.45	.41	.38	.45	.38	.44	.38	.43	.43	.37	.36	.36	.33	.30	.29	
6	.48	.42	.38	.35	.41	.34	.40	.34	.39	.34	.33	.33	.33	.30	.27	.26	
7	.45	.39	.34	.31	.38	.31	.37	.31	.37	.31	.30	.30	.30	.27	.24	.23	
8	.42	.36	.31	.29	.35	.29	.35	.28	.34	.28	.27	.27	.27	.24	.21	.20	
9	.40	.33	.29	.26	.33	.26	.32	.26	.31	.26	.25	.25	.25	.22	.19	.18	
10	.37	.31	.27	.24	.30	.24	.30	.24	.29	.24	.23	.23	.23	.20	.17	.16	

P921 One 32W Triple Tube Philips
P922 One 42W Triple Tube Philips x .94
P921 One 32W Triple Tube Osram x .83
P922 One 42W Triple Tube Osram x .75

Kurt Versen Company, Westwood, New Jersey

Type: L1B



P949

Medium Beam
Two 26-32-42W Triple Tube Lamps
8 3/8" Conoid Apertures

Optics and Applications

The two reflector optical system features an elliptical primary reflector and a deep parabolic shielding cone designed for use in higher ceilings. Pattern edges blend softly with adjacent units. See model P942 on page 56 for shallower recess depth and wider distribution.

Design Features

Construction allows easy access to all components. Vented air flow design lowers fixture temperature for optimal lamp performance. Fixtures accept Philips, Osram Sylvania, GE or other compatible lamps despite the variance in lamp bases. Maximum ceiling thickness 2". Ballast and lamp service from below.

Finish

A specular clear Alzak cone is standard. Optional colors and Softglow® finishes are available. The housing and all structural parts are phosphated for corrosion resistance before being painted optical matte black for control of stray light leaks.

Ballast

Fully electronic, microprocessor controlled with variable starting current for inrush protection to assure rated lamp life. Input voltage ranges from 120V through 277V. Operates 26W, 32W or 42W triple tube lamps interchangeably. Power factor .98, starting temperature 0° F (-18° C), THD < 10%. Pre-heat start < 1.0 second. End of lamp life protection. Rated for > 50,000 starts.

General

Fixtures are pre-wired, UL and C-UL listed for eight wire 75°C branch circuit wiring. Union made IBEW. Luminaire Efficiency Rating (LER) data is in the photometric directory located in Section Z.

Accessories

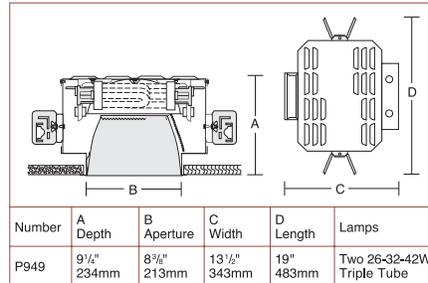
- G Gold cone. R2 26" support rails.
- H Mocha cone. R5 52" support rails.
- P Graphite cone. WT White trim flange.
- T Titanium cone. WHT White complete trim.
- W Wheat cone. DCE Double circuiting.
- Y Pewter cone. V347 347 volt ballast.
- Z Bronze cone. F Fuse.
- S Softglow® finishes: add S before color letters. e.g. SW for Softglow® wheat cone, SC for Softglow® clear cone.

- DM Dimming ballast, 26 or 32W. Specify watts and volts.
- DM2 Dimming ballasts, two 42W. Specify volts.
- LS Lamp shield, acrylic, 26-32W only.
- LP Prism lens, acrylic, 26-32W only.
- EM Emergency power includes integral charger light and test switch visible through aperture. Single lamp operation for 90 minutes. Specify volts.
- WRL Wattage restriction label, specify wattage.

Matching Units

- Sloped ceilings [Page P58](#)
- Shallow depth downlight [Page P56](#)
- Wall washer [Page P67](#)
- Surface cylinder [Pages P42, P43](#)

Dimensions and Lamps



Brightness

Number	Lamps	Plane	85° 75° 65° 55° 45°				
			85°	75°	65°	55°	45°
P949	Two 32W Triple Tube Philips	0°	12	17	32	58	7031
		90°	11	19	37	54	8534
	Two 42W Triple Tube Philips	0°	16	23	44	74	9398
		90°	15	26	50	72	11411
	Two 32W Triple Tube Osram/Sylvania	0°	12	15	23	48	6454
		90°	12	25	38	93	7385
Two 42W Triple Tube Osram/Sylvania	0°	15	21	30	62	8442	
	90°	16	33	50	121	9661	

Data in footcandlemeters. Photometer readings, Maximum Brightness Method. See note 7 on the other side.



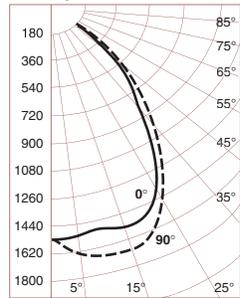
Type: L1B

57 P949

Performance Datachart

Single Unit Initial Footcandles, 30" Work Plane				Ceiling to Floor				Multiple Units Initial Footcandles, 30" Work Plane			
P949 Two 32W Philips Triple Tube Read Top Data								Ceiling 80% Walls 50% Floor 20%			
P949 Two 42W Philips Triple Tube Read Bottom Data								Spacing is Maximum Over Work Plane			
Nadir	15°	25°	35°					Spacing	RCR 1	RCR 3	RCR 8
FC	FC Diam	FC Diam	FC Diam								
51	48 3'	35 5'	16 8'	8'				6'	60	51	35
61	56 3'	43 5'	23 8'					7'	66	57	38
36	35 3'	25 6'	12 9'	9'				7'	43	36	25
44	40 3'	31 6'	16 9'					8'	47	41	27
27	26 4'	19 7'	9 11'	11'				8'	32	27	19
33	30 4'	23 7'	12 11'					9'	36	31	21
17	16 5'	12 9'	5 13'	12'				11'	20	17	12
20	19 5'	14 9'	8 13'					11'	22	19	13
12	11 6'	8 11'	4 16'	14'				13'	14	12	8
14	13 6'	10 11'	5 16'					14'	15	13	9

Candlepower Distribution

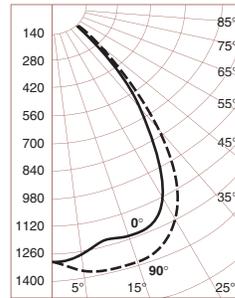


P949 Two 32W Triple Tube Philips
Eff. 44% S/M 0° 1.08 S/M 90° 1.17

Candelas

°	0°	90°
	4800*	4800*
0	1539	1539
5	1513	1654
10	1455	1688
15	1539	1696
20	1487	1644
25	1377	1461
30	1030	1220
35	754	1015
40	654	801
45	281	362
50	60	109
55	17	17
60	9	10
65	0	0
70	0	0
75	0	0
80	0	0
85	0	0
90	0	0

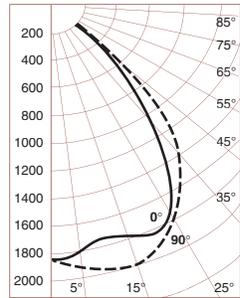
° Vertical Angles
* Initial Lamp Lumens



P949 Two 32W Triple Tube Osram Sylvania
Eff. 36% S/M 0° 1.06 S/M 90° 1.14

°	0°	90°
	4800*	4800*
0	1304	1304
5	1280	1380
10	1208	1392
15	1248	1396
20	1236	1360
25	1124	1256
30	855	987
35	623	755
40	501	585
45	202	283
50	48	85
55	14	14
60	8	8
65	3	3
70	0	0
75	0	0
80	0	0
85	0	0
90	0	0

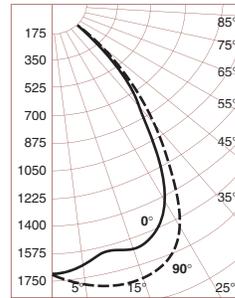
° Vertical Angles
* Initial Lamp Lumens



P949 Two 42W Triple Tube Osram
Eff. 42% S/M 0° 1.15 S/M 90° 1.25

°	0°	90°
	6400*	6400*
0	1845	1845
5	1816	1946
10	1692	1972
15	1749	2008
20	1816	1941
25	1728	1775
30	1439	1599
35	1123	1392
40	892	1056
45	220	473
50	47	134
55	17	23
60	12	15
65	5	12
70	0	0
75	0	0
80	0	0
85	0	0
90	0	0

° Vertical Angles
* Initial Lamp Lumens



P949 Two 42W Triple Tube Osram Sylvania
Eff. 35% S/M 0° 1.06 S/M 90° 1.14

°	0°	90°
	6400*	6400*
0	1698	1698
5	1667	1797
10	1573	1813
15	1625	1818
20	1609	1771
25	1463	1635
30	1113	1285
35	811	983
40	652	762
45	263	368
50	62	111
55	18	18
60	11	10
65	4	4
70	0	0
75	0	0
80	0	0
85	0	0
90	0	0

° Vertical Angles
* Initial Lamp Lumens

Notes

- Data on all charts calculated with a clear specular cone finish.
- Specular cone multipliers: Gold x .92, Wheat x .88, Pewter x .80, Mocha x .78, Graphite x .78, Titanium x .78, Bronze x .75.
- Softglow® cone multipliers: Clear x .93, Gold x .92, Wheat x .87, Pewter x .78, Mocha x .78, Graphite x .77, Titanium x .77, Bronze x .76.
- Single unit Datachart pattern diameters are determined by the number of degrees from each side of nadir. Therefore a 20° diameter represents a total 40° pattern width at the work plane 30" above the floor. Footcandle values are at the edge of that diameter.
- Datachart spacing is rounded off to the nearest foot.
- Data by IES methods. Compact fluorescent data vary due to lamp lumen differences, power input, burning position, ambient temperature and ballast characteristics. A modification factor should be applied.
- Brightness data from the Average Luminance Method are inaccurate for small aperture downlights. They are theoretical calculations derived for large surfaces such as troffers. For a complete discussion refer to section Z brochure Z1.

Coefficients of Utilization

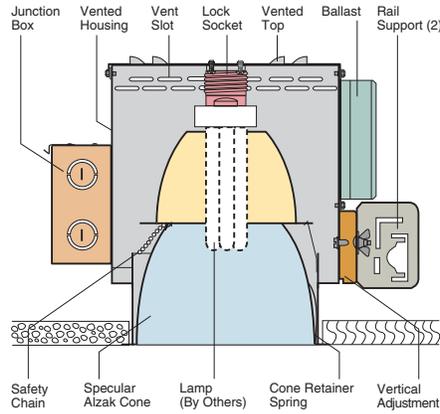
Ceiling	80%				70%				50%				30%				0				
	70	50	30	10	50	10	50	10	50	10	50	10	50	10	50	10	50	10	50	10	
1	.49	.48	.47	.46	.47	.45	.45	.43	.43	.42	.40										
2	.46	.44	.42	.41	.43	.40	.42	.39	.41	.38	.37										
3	.44	.41	.38	.37	.40	.36	.39	.36	.38	.35	.34										
4	.41	.38	.35	.33	.37	.33	.36	.33	.35	.32	.31										
5	.39	.35	.32	.30	.35	.30	.34	.30	.33	.30	.29										
6	.37	.32	.30	.28	.32	.28	.31	.27	.31	.27	.26										
7	.35	.30	.27	.25	.30	.25	.29	.25	.29	.25	.24										
8	.33	.28	.25	.23	.28	.23	.27	.23	.27	.23	.22										
9	.31	.26	.24	.22	.26	.22	.26	.22	.25	.21	.21										
10	.29	.25	.22	.20	.24	.20	.24	.20	.24	.20	.19										

P949 Two 32W Triple Tube Philips
P949 Two 42W Triple Tube Philips x .94

P949 Two 32W Triple Tube Osram x .82
P949 Two 42W Triple Tube Osram x .80

Kurt Versen Company, Westwood, New Jersey

Type: L1C



Dimensions and Lamps

Number	A Depth*	B Aperture	C Width	D Length	Lamps
P926	9 3/4" 248mm	5 7/8" 149mm	10 1/2" 267mm	13 1/4" 337mm	26W or 32W Triple Tube
P927	10 1/4" 260mm	5 7/8" 149mm	10 1/2" 267mm	13 1/4" 337mm	42W Triple Tube

*Recess depth increases to 12 1/2" with EM and DM accessories.

P926 One 26W or 32W Triple Tube Lamp
P927 One 42W Triple Tube Lamp

P5

Medium Beam
5 7/8" Conoid Apertures

Optics and Applications

Distribution from a single vertically mounted triple tube lamp is for general lighting. Spacing to mounting height ratios range from .93 to 1.11 depending upon which lamp is mounted. Use in corridors, entries, work stations or open area lighting in low to medium height ceilings.

Design Features

The two reflector optical system is protected by a rigid steel housing which keeps the reflectors in proper relationship to each other. The twist and lock socket prevents the lamp from falling if it is not properly engaged. It is a dependable fail-safe mechanism to prevent injury and litigation. Maximum ceiling thickness is 2". Ballast and lamp service from below.

Finish

Specular clear Alzak cones are standard. Optional colors and Softglow® finishes are available. Housings and structural parts are painted optical matte black to suppress stray light leaks. Steel parts are phosphate conditioned for corrosion resistance before painting.

Ballasts

Fully electronic, microprocessor controlled with variable starting current for inrush protection to assure rated lamp life. Input voltage ranges from 120V through 277V. Power factor .98, starting temperature 0° F (-18° C), THD < 10%. Pre-heat start < 1.0 second. End of lamp life protection. Rated for > 50,000 starts.

General

Fixtures are pre-wired, UL and C-UL listed for eight wire 75°C branch circuit wiring. Union made IBEW. Luminaire Efficiency Rating (LER) data is in the photometric directory located in Section Z.

Accessories

- G Gold cone.
- H Mocha cone.
- P Graphite cone.
- T Titanium cone.
- W Wheat cone.
- Y Pewter cone.
- Z Bronze cone.
- S Softglow® finishes: add S before color letters. e.g. SW for Softglow® wheat cone, SC for Softglow® clear cone.
- DM Dimming ballast. Specify watts and volts.
- EM Emergency power includes integral charger light and test switch visible through aperture. Single lamp operation for 90 minutes. Specify volts.
- WRL Wattage restriction label, specify wattage.
- R2 26" support rails.
- R5 52" support rails.
- WT White trim flange.
- WHT White complete trim.
- V347 347 volt ballast.
- F Fuse.

Matching Units

Medium wide beam [Page P52](#)
 Wall washers [Pages P61, P62, P63](#)



Type: L1C

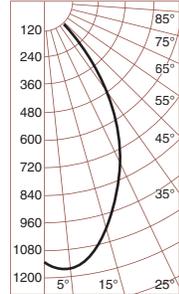
'51 P926 P927

Performance Datachart

Single Unit Initial Footcandles, 30° Work Plane						Ceiling to Floor	Multiple Units Initial Footcandles, 30° Work Plane			
P926 One 32W Osram Triple Tube Read Top Data						8'	Ceiling 80% Walls 50% Floor 20%			
P927 One 42W Osram Triple Tube Read Bottom Data							Spacing is Maximum Over Work Plane			
Nadir	10°		20°		30°	Spacing	RCR 1	RCR 3	RCR 8	
FC	FC	Diam	FC	Diam	FC					Diam
37	35	2'	25	4'	13	6'	5'	49	42	30
47	42	2'	30	4'	17	6'	5'	66	56	39
27	25	2'	18	5'	10	8'	6'	35	30	21
33	30	2'	21	5'	12	8'	6'	47	40	28
20	19	3'	14	5'	7	9'	7'	26	23	16
25	23	3'	16	5'	9	9'	7'	36	30	21
13	12	3'	8	7'	4	11'	9'	17	14	10
16	14	3'	10	7'	6	11'	9'	22	19	13
9	8	4'	6	8'	3	13'	11'	11	10	7
11	10	4'	7	8'	4	13'	11'	15	13	9

See notes 4, 5 and 6.

Candlepower Distribution



P926 32W Triple Tube Osram
Eff. 50% S/M .95

Candelas

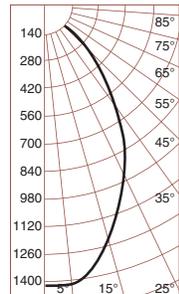
o	O 32W	P 32W
	2400*	2400*
0	1134	938
5	1152	1021
10	1109	1055
15	1023	1020
20	916	956
25	799	837
30	625	667
35	460	467
40	353	321
45	212	173
50	19	16
55	7	6
60	0	0
65	0	0
70	0	0
75	0	0
80	0	0
85	0	0
90	0	0

* Vertical Angles
* Initial Lamp Lumens

Coefficients of Utilization

Ceiling	80%				70%				50%				30%				0
	Wall %	70	50	30	10	50	10	50	10	50	10	50	10	50	10	0	
RCR	Zonal Cavity Method - Floor Reflectance 20%																
1	.57	.56	.55	.53	.55	.52	.53	.51	.51	.49	.47	.49	.46	.48	.45	.43	
2	.54	.52	.50	.48	.51	.47	.49	.46	.48	.45	.41	.40	.41	.40	.38	.37	
3	.51	.48	.45	.43	.47	.43	.46	.42	.45	.41	.37	.36	.37	.35	.33	.32	
4	.48	.44	.41	.39	.44	.39	.43	.38	.42	.38	.34	.33	.34	.32	.30	.29	
5	.46	.41	.38	.36	.41	.36	.40	.35	.39	.35	.31	.30	.31	.29	.27	.26	
6	.43	.38	.35	.33	.38	.33	.37	.33	.36	.32	.28	.27	.28	.26	.24	.23	
7	.41	.36	.33	.30	.35	.30	.35	.30	.34	.30	.26	.25	.26	.24	.22	.21	
8	.39	.34	.30	.28	.33	.28	.33	.28	.32	.28	.24	.23	.24	.22	.20	.19	
9	.37	.31	.28	.26	.31	.26	.31	.26	.30	.26	.22	.21	.22	.20	.18	.17	
10	.35	.30	.26	.24	.29	.24	.29	.24	.28	.24	.20	.19	.20	.18	.16	.15	

P926 One 32W Triple Tube Osram Sylvania
P926 One 32W Triple Tube Philips x .98



o	O 42W	P 42W
	3200*	3200*
0	1412	1104
5	1403	1198
10	1328	1211
15	1176	1154
20	1092	1063
25	958	919
30	789	747
35	611	583
40	487	441
45	355	253
50	75	23
55	10	8
60	0	0
65	0	0
70	0	0
75	0	0
80	0	0
85	0	0
90	0	0

* Vertical Angles
* Initial Lamp Lumens

Ceiling	80%				70%				50%				30%				0
	Wall %	70	50	30	10	50	10	50	10	50	10	50	10	50	10	0	
RCR	Zonal Cavity Method - Floor Reflectance 20%																
1	.56	.55	.54	.53	.54	.52	.50	.50	.49	.46	.47	.45	.43	.41	.39	.38	
2	.53	.51	.49	.47	.50	.47	.48	.46	.47	.45	.41	.40	.39	.38	.36	.35	
3	.51	.47	.45	.43	.47	.42	.45	.42	.44	.41	.37	.36	.37	.35	.33	.32	
4	.48	.44	.41	.39	.43	.38	.42	.38	.41	.38	.34	.33	.34	.32	.30	.29	
5	.45	.41	.38	.35	.40	.35	.39	.35	.39	.35	.31	.30	.31	.29	.27	.26	
6	.43	.38	.35	.33	.38	.32	.37	.32	.36	.32	.28	.27	.28	.26	.24	.23	
7	.40	.35	.32	.30	.35	.30	.34	.30	.34	.30	.26	.25	.26	.24	.22	.21	
8	.38	.33	.30	.28	.33	.28	.32	.28	.32	.28	.24	.23	.24	.22	.20	.19	
9	.36	.31	.28	.26	.31	.26	.30	.26	.30	.26	.22	.21	.22	.20	.18	.17	
10	.34	.29	.26	.24	.29	.24	.29	.24	.28	.24	.20	.19	.20	.18	.16	.15	

P927 One 42W Triple Tube Osram Sylvania
P927 One 42W Triple Tube Philips x .89

Brightness

Number	Lamps	85°	75°	65°	55°	45°
P926	32W Osram Sylvania Triple Tube	10	33	66	150	12837
	32W Philips Triple Tube	12	34	62	151	10756
P927	42W Osram Sylvania Triple Tube	14	45	91	208	17796
	42W Philips Triple Tube	15	45	82	203	14468

Data in footlamberts. Photometer readings, Maximum Brightness Method. See note 7.

Notes

- 1 Data on all charts calculated with a clear specular cone finish.
- 2 Specular cone multipliers: Wheat x .84, Pewter x .79, Mocha x .78, Graphite x .75, Titanium x .75, Bronze x .72.
- 3 Softglow® cone multipliers: Wheat x .71, Mocha x .68, Pewter x .65, Graphite x .64, Titanium x .64, Bronze x .61.
- 4 Single unit Datachart pattern diameters are determined by the number of degrees from each side of nadir. Therefore a 20° diameter represents a total 40° pattern width at the work plane 30" above the floor. Footcandle values are at the edge of that diameter.
- 5 Datachart spacing is rounded off to the nearest foot.
- 6 Data by IES methods. Compact fluorescent data vary due to lamp differences, power input, burning position, ambient temperature and ballast characteristics. Apply a modification factor.
- 7 Brightness data from the Average Luminance Method are inaccurate for small aperture downlights. They are theoretical calculations derived for large surfaces such as troffers. For a complete discussion refer to section Z brochure Z1.

 Kurt Versen Company, Westwood, New Jersey

Type: L2A

M100 Recessed Linear Fluorescent Asymmetrical Flanged Extrusion



Project: _____ Type: _____ Qty. _____

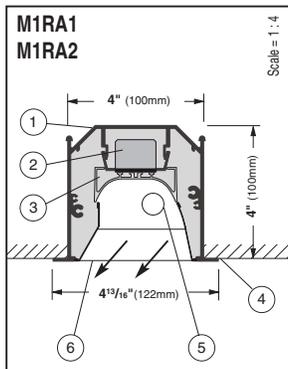
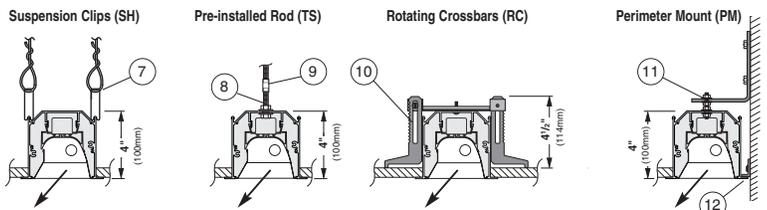
Fixture Series	Lamp Type	Shielding	Mounting	Nominal Length	Finish	Voltage
-	-	-	-	-	-	-

Options (refer to separate data sheets for ordering codes and details)

Fixture Series	Lamp Type	Shielding	Mounting	Nominal Length	Finish	Voltage	Options
M1RA1 M100 Recessed Asymmetrical Continuous Flange (Flanged Extrusion/ Flanged Endcaps)	1T5 F28T5	AMP Asymmetric Silky Specular Louver	SH Suspension Clips	004 4 foot	WH White	120	TB Lengths to Fit 2' Grid T-Bar Ceiling System ¹
	1T5HO F54T5HO	SD Satine Lens	TS 1" Studs (factory installed)	008 8 foot	BK Black	277	(by)EM Stand-by Battery Pack ² (prefix quantity, i.e. - 5EM)
			RC Rotating Crossbars PM Perimeter Mount	012 12 foot	SV Silver	347	FS Single Fusing DM Dimming ² (specify system) DMA Digital Addressable Dimming ² FW Flex Whip (standard) FW1 Flex Whip (dimming) DL Suitable for Damp Locations CCEA Chicago Plenum Downlights (See MR16 spec sheets, pp.98-99)
M1RA2 M100 Recessed Asymmetrical Flush End (Flanged Extrusion/ Flangeless Endcaps)				For actual lengths see following page. For other lengths, configura- tions indicate nominal length rounded to the next highest foot. Factory will supply layout draw- ings. Individual fixtures cannot be field joined.	SP Specify RAL#		

¹T5 & T5HO lamps only, consult factory for other lamps. ²Must be low profile ballasts (1 1/2" W x 1 1/2" H); consult factory for details. ³Consult factory for details.

Mounting Diagrams



- Housing** - Continuous, 6063-T5 extruded aluminum profile up to 16 feet long. Joined with Connector Plus Joining System for ease of installation and to assure a uniform appearance.
- Ballast** - Electronic, high power factor, class "P", type "A" sound rating. Specify 120v, 277v, or 347v. Ballast is factory pre-wired with leads to one end of fixture. Consult factory for ballast options.
- Gear Tray** - Extruded aluminum, with white painted finish. Gear tray installed as a complete electrical unit and is held in place with knurled dress nuts. It is fully accessible from below ceiling.
- Flange** - 1/2" (12mm) wide flange runs full lengths of both sides and is part of the main extruded body. Specify continuous flange (M1RA1) or flush end (M1RA2).
- Lamps** - As noted (by others). Other lamp lengths or wattages available, consult factory.
- Shielding** - Louvers offer excellent glare control in longitudinal, lateral, and all diagonal planes. High quality aluminum louvers and acrylic shielding allow true freedom of layout for contemporary modern spaces.
- Spring steel suspension clips** - Supplied two places, located nominally every 4 ft. Support wires Supplied and installed by others.
- Pre-installed 1" 1/4-20 Stud** - Attached to fixture every nominal 4 feet.
- Coupling and Threaded Rod to Structure** - Supplied and installed by others.
- Rotating Crossbars** - For inaccessible ceilings, adjustable for ceiling thicknesses from 1/4" to 2". Support required nominally every 4'.
- Steel Wall Bracket** and 1/4-20 rod supplied nominally every 4 ft. (Fasteners to wall and wall anchors by others)
- Aluminum Wall Bracket** - Secured to wall (fasteners and wall anchors by others) and runs entire length of fixture. Also supplied for width of fixtures when supplied with continuous flange. Allows for 1/8" gap between flange and wall to create shadow line allowing for unevenness of wall.

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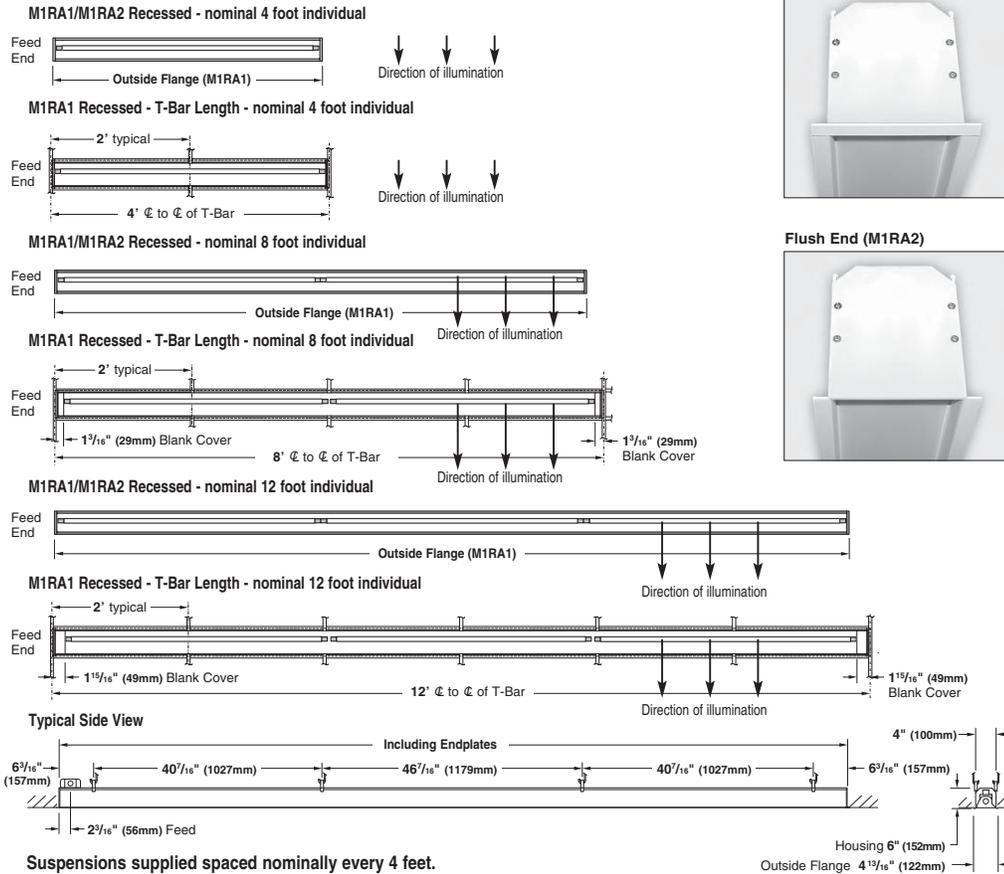
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Type: L2A

M100 Recessed Linear Fluorescent Asymmetrical Flanged Extrusion



M1RA1 and M1RA2 Layout Dimensions



Continuous Flange (M1RA1)

Flush End (M1RA2)

Suspensions supplied spaced nominally every 4 feet.
 Fixture supplied with 7/8 knockout located 2³/₁₆" from end in top of fixture.

	T5 (1 or 2 lamp)				T8 (1 lamp)	
	M1RA1/M1RA2 Including Endplates	M1RA1 Outside Flange	M1RA1/M1RA2 - TB Including Endplates	M1RA1 - TB Outside Flange	M1RA1/M1RA2 Including Endplates	M1RA1 Outside Flange
4 foot individual	46.81" (1186mm)	47.58" (1209mm)	47.03" (1195mm)	47.91" (1216mm)	48.33" (1228mm)	49.20" (1250mm)
8 foot individual	93.21" (2365mm)	94.00" (2388mm)	95.03" (2414mm)	95.91" (2436mm)	96.37" (2448mm)	97.24" (2470mm)
12 foot individual	139.65" (3544mm)	140.41" (3567mm)	143.03" (3633mm)	143.91" (3655mm)	144.41" (3668mm)	145.28" (3690mm)

For other lengths, lampping, continuous runs or configurations please specify overall length (in feet), accessories desired and sketch/drawing of configuration. SELUX will detail project drawings upon order and supply submittal drawings for approval. Individual fixtures cannot be field joined. If you have any questions please contact SELUX customer service or applications engineering for assistance (1-800-SELUX-CS).

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 PO Box 1060, 5 Lumen Lane / Highland, NY 12528
 TEL: (845) 691-7723 / FAX: (845) 691-6749
 E-mail: selux@selux.com / Web Site: www.selux.com/usa
 M1RA1-02 (02/06)

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Type: L2B

M100 Super Recessed Linear Fluorescent Flanged Extrusion - STAGGERED LAMPS



Project: _____ Type: _____ Qty: _____

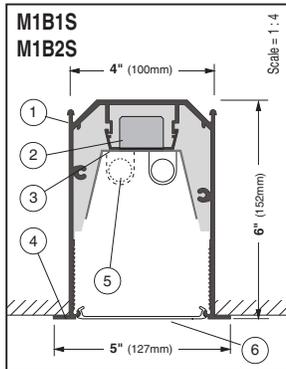
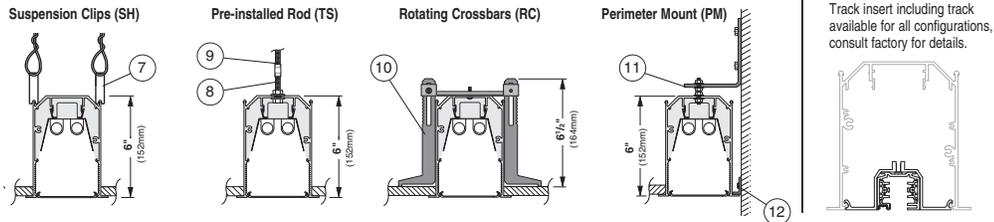
Fixture Series	Lamp Type	Upper Shielding	Lower Shielding	Mounting	Nominal Length	Finish	Voltage

Options (refer to separate data sheets for ordering codes and details)

Fixture Series	Lamp Type	Lower Shielding	Mounting	Nominal Length	Finish	Voltage	Options
M1B1S M100 Super Recessed Continuous Flange (Flanged Extrusion/ Flanged Endcaps) Staggered Lamps	1T5 F28T5 1T5HO F54T5HO	SA Specular Parabolic MA Matte Parabolic MP Silky Specular Parabolic PL Matte Perforated Parabolic SD Satine Lens OD Extra Diffuse Lens X None	SH Suspension Clips TS 1" Studs (factory installed) RC Rotating Crossbars PM Perimeter Mount	008 8 foot 012 12 foot For actual lengths see following page. For other lengths, configurations indicate nominal length rounded to the next highest foot. Factory will supply layout drawings. Individual fixtures cannot be field joined.	WH White BK Black SV Silver SP Specify RAL#	120 277 347	TB Lengths to Fit 2' Grid T-Bar Ceiling System (qty)EM Stand-by Battery Pack ¹ (prefix quantity, i.e. - 5EM) FS Single Fusing DM Dimming ¹ (specify system) DMA Digital Addressable Dimming ¹ FW Flex Whip (standard) FW1 Flex Whip (dimming) Track Etrac Standard ² DL Suitable for Damp Locations CCEA Chicago Plenum Downlights (See MR16 spec sheets, pp.98-99)
	M1B2S M100 Super Recessed Flush End (Flanged Extrusion/ Flangeless Endcaps) Staggered Lamps	2T5 (2x)F28/T5	Upper Shielding SD Satine Lens OD Extra Diffuse Lens X None				

¹Must be low profile ballasts (1 1/2" W x 1 1/4" H); consult factory for details. ²Consult factory for details.

Mounting Diagrams



- 1. Housing** - Continuous, 6063-T5 extruded aluminum profile up to 16 feet long. Joined with Connector Plus Joining System for ease of installation and to assure a uniform appearance.
- 2. Ballast** - Electronic, high power factor, class "P", type "A" sound rating. Specify 120v, 277v, or 347v. Ballast is factory pre-wired with leads to one end of fixture. Consult factory for ballast options.
- 3. Gear Tray** - Die formed gear tray with integral factory preset sliding covers to fill extrusion with light, with a matt white finish for even illumination. Geartray installs as complete electrical unit and is held in place with knurled dress nuts. It is fully accessible from below ceiling.
- 4. Flange** - 1/2" (12mm) wide flange runs full lengths of both sides and is part of the main extruded body. Specify continuous flange (M1B1S) or flush end (M1B2S).
- 5. Lamps** - As noted by others. Other lamp lengths or wattages available, consult factory.
- 6. Shielding** - Louvers offer excellent glare control in longitudinal, lateral, and all diagonal planes. High quality aluminum louvers and acrylic shielding allow true freedom of layout for today's modern spaces. See page 8 for details.
- 7. Spring Steel Suspension Clips** - Supplied two places, located nominally every 4 ft. Support wires supplied and installed by others.
- 8. Pre-installed 1" 1/4-20 Stud** - Attached to fixture every nominal 4 feet.
- 9. Coupling and Threaded Rod to Structure** - Supplied and installed by others.
- 10. Rotating Crossbar** - For inaccessible ceilings, adjustable for ceiling thicknesses from 1/4" to 2". Support required nominally every 4 feet.
- 11. Steel Wall Bracket and 1/4-20 Rod** - Supplied nominally every 4 ft. (Fasteners to wall and wall anchors by others)
- 12. Aluminum Wall Bracket** - Secured to wall (fasteners and wall anchors by others) and runs entire length of fixture. Also supplied for width of fixtures when supplied with continuous flange. Allows for 1/8" gap between flange and wall to create shadow line allowing for unevenness of wall.

Interior Luminaire Finish - Standard interior colors are White (WH), Black (BK) and Silver (SV). RAL colors (SP) are available, please specify RAL#.

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 TEL: (845) 691-7723
 FAX: (845) 691-6749
 www.selux.com/usa
 M1B1S-01 (v5.0)

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 with **IBEW Local 363**

In a continuing effort to offer the best product possible, we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product. Specification sheets found at www.selux.com/usa are the most recent versions and supercede all other printed or electronic versions.

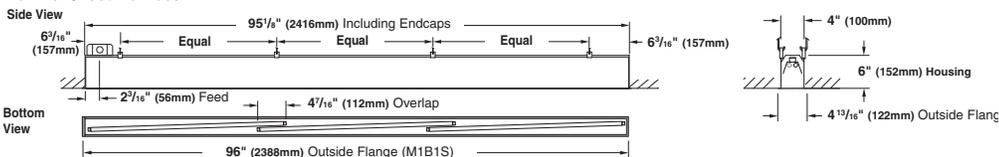
Type: L2B

M100 Super Recessed Linear Fluorescent Flanged Extrusion - STAGGERED LAMPS

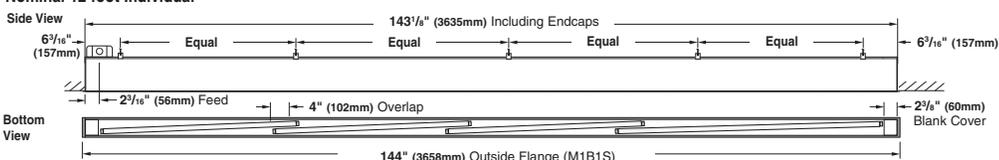


M1B1S/M1B2S (Single Staggered Lamps) Standard Layout Dimensions

Nominal 8 foot Individual

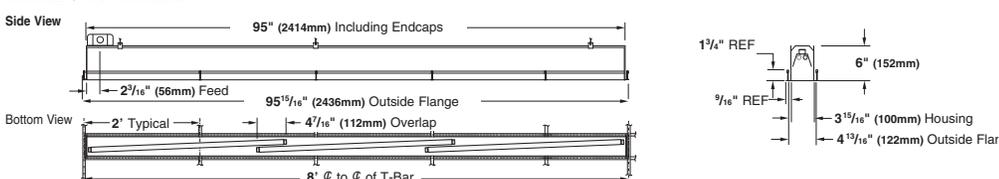


Nominal 12 foot Individual

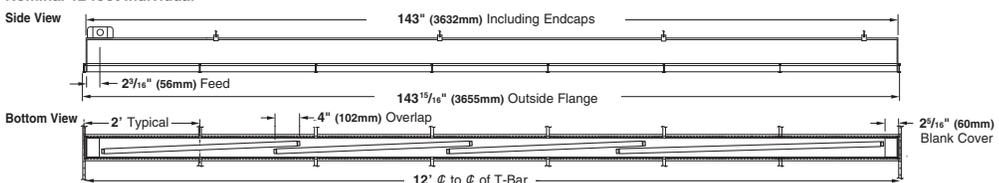


M1B1S (Single Staggered Lamps) T-Bar Layout Dimensions (option - TB)

Nominal 8 foot Individual



Nominal 12 foot Individual



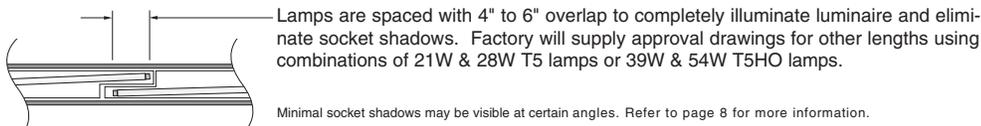
Suspensions supplied spaced nominally every 4 feet. Fixture supplied with 7/8 knockout located 2 7/16 inch from end in top of fixture. See chart on page 6 for optimal custom lengths under 18 ft. Any length over 18 ft. possible, see below.

For other lengths, lamping, continuous runs or configurations please specify overall length (in feet), accessories desired and sketch/drawing of configuration. SELUX will detail project drawings upon order and supply submittal drawings for approval. Individual fixtures cannot be field joined. If you have any questions please contact SELUX customer service or applications engineering for assistance (1-800-SELUX-CS).

M1B1S/M1B2S (Double Staggered Lamps) Layout Dimensions -

Factory will provide submittal drawings. See chart on page 7 for lengths under 22 ft.

Staggered Lamps Principle



M1B1S-02 (02/06)

In a continuing effort to offer the best product possible, we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product. Specification sheets found at www.selux.com/usa are the most recent versions and supersede all other printed or electronic versions.

Type: L3

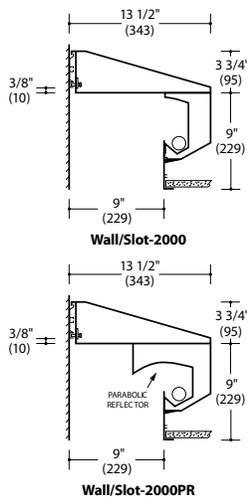
LITECONTROL



Type:
Project:

Wall/Slot®-2000
Wall/Slot®-2000PR
2000 or 2000PR
Recessed Perimeter

Specifications



FIXTURE SUPPORT RAIL. Extruded white aluminum, wall-mounted rail provides continuous support and true alignment of fixtures and components. Rail is designed to provide a reveal at the wall to compensate for irregularities in wall construction. Galvanized splines are included for continuous alignment.

FIXTURE HOUSING. Die-formed and welded steel. Plenum cover/wall bracket is a one-piece assembly of 20-gauge steel and heavy-gauge steel brackets with leveling screws to provide adjustment. Brackets are spaced approximately every two feet for 2-, 4-, and 8-foot fixtures, and 1 1/2 feet for 3-foot and 6-foot fixtures. Plenum cover has a continuous hook-and-lock feature for quick installation.

REFLECTOR. 2000 curved reflector is die-formed specular hammertone aluminum, precisely shaped for maximum downward light projection. Straight reflector portions are steel, finished in high-reflectance white for uniform light distribution. **2000PR** uses a larger parabolic reflector (**PR**), die-formed, hammertone, low-iridescence semi-specular aluminum, precisely shaped for maximum downward light projection. It is shielded from all viewing angles from 0° to 60° below horizontal. Straight reflector portions are steel, finished in high-reflectance white for uniform light distribution.

CEILING TRIM/LUMINANCE CONTROL DEFLECTOR. Extruded aluminum with internal aligner splines. **LCD** shields lamps from direct view and eliminates socket shadows on wall. Paint finish is Matte White (**CWM**) baked enamel.

LAMPING. Available in one-lamp T5, T5HO, or T8, or one-lamp twin-tube compact fluorescent.

BALLAST. Electronic Ballast (**ELB** - for T8 or BX Lamping) or Low-profile Electronic Ballast (**LP/ELB** - for T5 or T5HO lamping), high power factor, thermally protected Class P, Sound Rated A, manufactured by a UL Listed manufacturer, as available, determined by Litecontrol. Ballasts with a voltage range of 120 to 277 will be used when fixture configuration and ballast availability allow. The minimum number of ballasts will be used.

CEILING TYPE. Compatible with most types of ceiling systems, including grid and plaster. Fixture system must be installed prior to installation of ceiling. Finish of wall should extend 13" above finished ceiling height. See Wall/Slot-2000 Pre-Installation Manual for specific ceiling type details.

CERTIFICATION. Fixture and electrical components shall be UL and/or CUL Listed and shall bear the I.B.E.W., A.F. of L. label. UL

Note: Litecontrol reserves the right to change specifications without notice for product development and improvement.

Ordering guide

Product, lamping, & length				Options				Cross-section lamping		
20	1	4	T8 -	CWM -	ELB -	PR -	120			
Series	Lamp Count	Nominal Length(ft)	Lamp Type	Finish	Ballast	Other options	Volts			
20	1 →	2,3,4 →	T8	CWM (Matte White) is standard	ELB is std. for T8 or BX LP/ELB is std. for T5 or T5HO	EF F PR SDS see Other options	120 277	2000		
	2 →	6,8 →	T8							
	1 →	3,4 →	T5HO					2000PR		
	2 →	6,8 →	T5							
	1 →	2 →	BX40					1-T8 1-T5 or T5HO 1-BX39 or 40		
	2 →	4 →	BX40							
	4 →	8 →	BX40					1-T8 1-T5 or T5HO 1-BX39 or 40		
	2 →	3 →	BX39							
4 →	6 →	BX39	1-T8 1-T5 or T5HO 1-BX39 or 40							
see notes						DA/ELB HEL/ELB ECO/ELB see Ballast options				

2014T8-CWM-ELB-1CWQ-PR-120 is a typical catalog number for a 1-lamp (1 lamp in cross-section), 4-foot long T8 fixture, Matte White finish, electronic ballast, pre-wired with single-circuit branch-wiring, parabolic reflector, 120 volts.

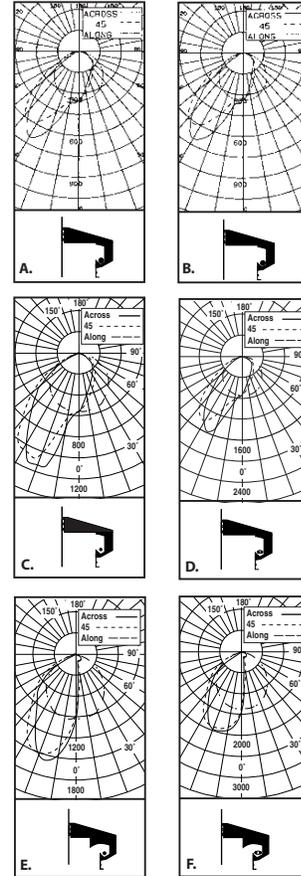
Questions to Ask

1. 120 or 277 volt?
2. Row information, including desired fixture lengths?
3. Verify ceiling type?
4. Other options?

litecontrol.com

Type: L3

Photometric data



- A.** 2014T8 70% wall reflectance
Litecontrol Certified Test Report #14711001
- B.** 2014T8 50% wall reflectance
Litecontrol Certified Test Report #14711000
- C.** 2014T5HO 50% wall reflectance
Litecontrol Certified Test Report #14716000
- D.** 2024BX40 50% wall reflectance
Litecontrol Certified Test Report #14720000
- E.** 2014T5HO-PR 50% wall reflectance
Litecontrol Certified Test Report #24316000
- F.** 2024BX40-PR 50% wall reflectance
Litecontrol Certified Test Report #24320000

For complete photometric information, see website.



Ballast options

Specify in place of **ELB** or **LP/ELB**, contact factory for availability:

- DA/ELB** Advance Mark VII Dimming Ballast.
- HEL/ELB** Osram Sylvania Helios Dimming Ballast.
- ECO/ELB** Lutron ECO-10 Dimming Ballast.

Other options

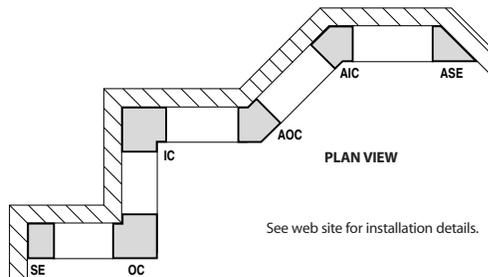
- EF** Emergency Fluorescent Ballast. Battery-powered ballast from a UL Listed manufacturer will operate one T8 lamp for 1 1/2 hours.
- F** Fuse. Slow or fast blow, determined by Litecontrol.
- PR** Parabolic Reflector. Larger specular hammertone aluminum reflector for additional downward light projection.
- SDS** Special Depth Shield. A shallow-depth fixture of 10 1/2" height is available for areas where obstructions occur. Contact factory.

System connectors

Series	Connector	Finish	Description (Minimum-Maximum along wall in parenthesis)
2000	EC	CWM	End Cap
2000	SE	CWM	Straight Extension (2"-12")
2000	IC	CWM	Inside Corner - 90° (14"-21")
2000	OC	CWM	Outside Corner - 90° (2"-11")
2000	ASE	CWM	Angular Straight Extension - 135° (2"-11")
2000	AIC	CWM	Angular Inside Corner - 135° (6"-15")
2000	AOC	CWM	Angular Outside Corner - 135° (2"-11")

2000-AOC-CWM is a typical catalog number for an angular outside corner connector. Corners, extensions, and end caps, when added to fixtures, permit continuous wall-to-wall installation. Lengths are field cut.
Finish: CWM (Matte White)

NOTE: Parabolic reflector is positioned above lamps only, and does not extend through system connectors.



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 100 Hawks Avenue Hanson MA 02341 781 294 0100 FAX 781 293 2849 info@litecontrol.com litecontrol.com

Type: L3

PHOTOMETRIC DATA: Wall/Slot-2000																								
	CANDLEPOWER SUMMARY					2014T8-120 70% wall reflectance Litecontrol Certified Test Report #14710001					ZONAL LUMEN SUMMARY ZONE LUMENS % LAMP % LUMINAIRE													
	ANGLE	0	45	90	135	180	OUTPUT LUMENS	RCC	80	70	50	30	10	0	180-90°	0	0.0	0.0						
		0	0	1	1	1	14	RW	70	50	30	10	0	0	90-0°	1090	37.61	100						
		85	6	7	14	15	13	RCR	0	45	45	45	44	44	44	44	42	42	40	38	38	38		
		30	16	16	41	29	27		1	42	40	39	37	41	39	38	37	38	37	36	36	35	35	
		75	25	29	71	46	41	49	2	38	36	33	31	37	35	33	31	33	32	30	32	31	30	29
		60	36	43	103	64	57		3	35	32	29	27	34	31	29	27	30	28	26	29	27	26	25
		45	49	87	133	82	73	103	4	32	28	25	23	32	28	25	23	27	24	22	26	24	22	21
		30	70	130	180	127	118	176	5	30	25	22	19	29	25	22	19	24	21	19	23	21	19	22
		15	50	90	135	180	127	176	6	27	22	19	17	27	22	19	17	21	19	17	21	18	17	20
	0	30	45	90	135	180	127	7	25	20	17	15	24	20	17	15	19	16	15	19	16	14	18	
	0	30	45	90	135	180	127	8	23	18	15	13	22	18	15	13	17	14	12	17	14	12	16	
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	0	30	45	90	135	180	127	10	19	15	11	09	19	14	11	09	14	11	09	13	11	09	13	
	0	30	45	90	135	180	127	10																

Type: L3

PHOTOMETRIC DATA: Wall/Slot-2000PR

CANDLEPOWER SUMMARY

ANGLE	0	45	90	135	180	OUTPUT LUMENS
90	0	0	0	0	0	0
85	1	3	12	10	8	9
80	10	12	37	21	20	20
75	19	22	79	35	32	46
70	28	34	151	49	43	107
65	38	133	228	63	56	107
60	90	245	311	75	70	107
55	233	332	397	86	83	189
50	341	363	482	90	96	230
45	433	393	563	90	102	230
40	453	448	640	93	102	231
35	469	526	713	92	100	231
30	525	614	777	92	98	231
25	613	694	835	94	95	219
20	716	759	884	102	93	177
15	781	858	920	223	95	177
10	926	989	942	457	246	83
5	1014	996	951	769	625	83
0	954	954	954	954	954	

2014T8-PR 70% wall reflectance
Litecontrol Certified Test Report #24311001

RCC	80			70			50			30			10			0		
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
RCC	0	53	53	53	52	52	52	49	49	49	47	47	47	45	45	45	44	
1	49	48	46	45	48	47	45	44	45	44	43	43	42	41	42	41	40	
2	46	43	40	38	45	42	40	38	40	39	37	39	38	36	38	37	35	
3	42	39	36	33	41	38	35	33	37	34	32	36	34	32	34	33	31	
4	39	35	32	29	38	34	31	29	33	31	28	32	30	28	31	29	27	
5	36	31	28	25	35	31	27	25	30	27	25	29	27	25	28	26	24	
6	34	28	25	22	33	28	25	22	27	24	22	27	24	22	26	23	21	
7	31	26	22	20	31	25	22	20	25	22	20	24	21	19	24	21	19	
8	29	23	20	18	28	23	20	17	23	20	17	22	19	17	22	19	17	
9	27	21	18	16	25	21	18	16	21	18	15	20	17	15	20	17	15	
10	25	20	16	14	25	19	16	14	19	16	14	18	16	14	18	16	14	

ZONAL LUMEN SUMMARY

ZONE	LUMENS	% LAMP	% LUMINAIRE
180-90°	0	.00	.00
90-0°	1286	44.35	100
180-0°	1286	44.35	100

LUMINANCE SUMMARY (fL)

ANGLE	0°	45°	90°	135°	180°
45°	644	584	834	134	151
55°	428	608	724	157	151
65°	94	331	564	158	138
75°	76	90	320	140	130
85°	16	38	149	117	101

Floor Cavity Reflectance .20

CANDLEPOWER SUMMARY

ANGLE	0	45	90	135	180	OUTPUT LUMENS
90	0	0	1	1	2	2
85	5	8	21	10	4	13
80	7	20	53	25	19	19
75	24	31	89	44	26	63
70	33	77	149	62	51	163
65	44	265	223	81	67	163
60	191	441	305	90	84	300
55	432	597	393	98	95	300
50	613	687	476	104	103	375
45	760	809	564	103	109	375
40	829	973	642	100	113	390
35	941	1154	710	103	99	390
30	1113	1337	774	99	99	390
25	1319	1448	826	107	101	353
20	1498	1492	875	136	98	240
15	1558	1465	900	202	117	240
10	1478	1357	916	348	211	84
5	1259	1164	922	579	449	84
0	888	888	888	888	888	

2014T5HO-PR 50% wall reflectance
Litecontrol Certified Test Report #24316000

RCC	80			70			50			30			10			0		
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
RCC	0	47	47	47	46	46	46	44	44	44	42	42	42	40	40	40	40	
1	44	42	41	40	43	42	40	39	40	39	38	38	37	37	36	36	35	
2	41	38	36	34	40	37	35	34	36	34	33	35	33	32	34	32	31	
3	38	34	31	29	37	34	31	29	33	30	29	31	30	28	31	29	27	
4	35	31	28	25	34	30	28	25	29	27	25	28	26	25	28	26	24	
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8	25	20	17	15	25	20	17	15	19	17	15	19	16	15	19	16	15	
9	23	18	15	13	23	18	15	13	18	15	13	17	15	13	17	14	13	
10	22	17	14	12	21	16	14	12	16	13	11	16	13	11	15	13	11	

ZONAL LUMEN SUMMARY

ZONE	LUMENS	% LAMP	% LUMINAIRE
180-90°	0	.00	.00
90-0°	1977	39.55	100.00
180-0°	1977	39.55	100.00

LUMINANCE SUMMARY (fL)

ANGLE	0°	45°	90°	135°	180°
45°	1130	1203	835	152	163
55°	782	1094	717	179	174
65°	109	658	553	200	166
75°	96	126	360	179	107
85°	63	97	249	119	43

Floor Cavity Reflectance .20

CANDLEPOWER SUMMARY

ANGLE	0	45	90	135	180	OUTPUT LUMENS
90	3	1	2	3	1	16
85	3	8	28	12	7	16
80	15	21	71	31	26	63
75	27	37	128	53	41	80
70	30	77	250	79	63	206
65	52	310	346	97	85	206
60	196	572	480	118	101	393
55	518	775	581	132	119	393
50	808	940	700	140	133	511
45	1010	1136	819	135	146	511
40	1187	1343	928	138	140	538
35	1384	1591	1030	140	140	538
30	1587	1804	1118	151	138	475
25	1835	1882	1200	161	135	316
20	1953	1903	1262	186	145	316
15	1953	1897	1311	226	169	211
10	1895	1805	1336	385	223	117
5	1713	1652	1348	747	539	117
0	1310	1310	1310	1310	1310	

2024BX40-PR 50% wall reflectance
Litecontrol Certified Test Report #24320000

RCC	80			70			50			30			10			0		
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
RCC	0	50	50	50	49	49	49	49	47	47	47	45	45	45	43	43	43	42
1	47	45	44	43	46	44	43	42	42	41	41	41	40	39	39	39	37	
2	43	41	39	37	43	40	38	36	39	37	35	37	36	35	36	35	34	
3	40	37	34	32	39	36	34	31	35	33	31	34	32	30	33	31	29	
4	37	33	30	28	37	33	30	28	32	29	27	31	29	27	30	28	26	
5	35	30	27	24	34	30	27	24	29	26	24	28	26	24	27	25	24	
6	32	27	24	22	31	27	24	22	26	23	21	25	23	21	25	23	21	
7	30	25	21	19	29	24	21	19	24	21	19	23	20	19	23	20	18	
8	28	22	19	17	27	22	19	17	22	19	17	21	19	17	21	18	17	
9	26	20	17	15	25	20	17	15	20	17	15	19	17	15	19	16	15	
10	24	19	16	13	23	18	16	13	18	15	13	18	15	13	17	15	13	

ZONAL LUMEN SUMMARY

ZONE	LUMENS	% LAMP	% LUMINAIRE
180-90°	0	.00	.00
90-0°	2647	42.02	100.00
180-0°	2647	42.02	100.00

LUMINANCE SUMMARY (fL)

ANGLE	0°	45°	90°	135°	180°
45°	1502	1689	1212	201	218
55°	948	1420	1082	242	218
65°	130	770	857	242	211
75°	108	150	520	216	166
85°	34	98	333	142	81

Floor Cavity Reflectance .20

LITECONTROL
 100 HAWKS AVENUE HANSON MA 02341 781 294 0100 FAX 781 293 2849 info@litecontrol.com www.litecontrol.com

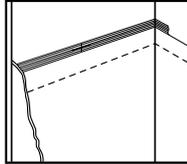
Final Report

Type: L3

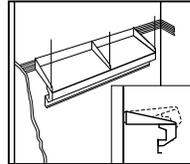
PLANNING FOR INSTALLATION

Finished wall should extend 13" above ceiling. Locate bottom of Fixture Support Rail 9 3/8" up from bottom of ceiling for Lay-in Grid T-bar ceilings. Extruded trim of fixtures supports ceiling tiles at perimeter; elsewhere ceiling construction must be supported independently of the lighting system.

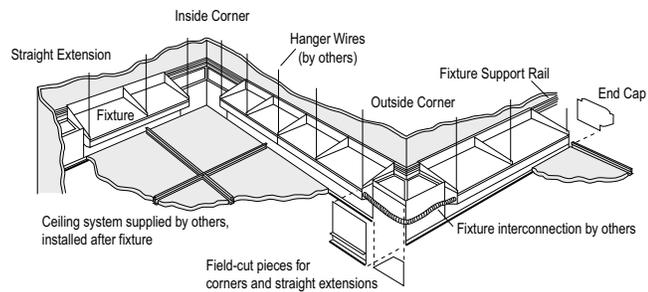
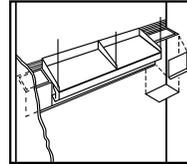
1. Install Fixture Support Rails on wall.



2. Hook fixtures on rail and slide into position. Attach hanger wires.



3. Install extensions and corners.



QUESTIONS TO ASK

1. 120 or 277 volt?
2. Row information, including desired fixture lengths?
3. Verify ceiling type?
4. Other options?

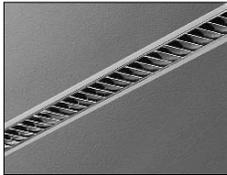
LITECONTROL

100 HAWKS AVENUE HANSON MA 02341 781 294 0100 FAX 781 293 2849 info@litecontrol.com www.litecontrol.com



Type: L4

M60 Linear Fluorescent Recessed



Project: _____ **Type:** _____ **Qty:** _____

Fixture Series **Lamp Type** **Shielding** **Mounting** **Linear Footage** **Finish** **Voltage**

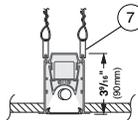
Options (refer to separate data sheets for ordering codes and details)

Fixture Series	Lamp Type	Shielding	Mounting	Linear Footage	Finish	Voltage	Options
M6R1 M60 Recessed Continuous Flange (Flanged Extrusion/Flanged Endcaps)	1T5 F28T5	MA Matte Parabolic	SH Suspension Clips	004 4 foot	WH White	120	TB Lengths to Fit 2' Grid T-Bar Ceiling System (M6R1 only) EM Stand-by Battery Pack ¹ (prefix quantity, i.e. - SEM) FS Single Fusing DM Dimming ¹ (specify system) DMA Digital Addressable Dimming ¹ SI Satine Acrylic Inlay ² FW Flex Whip (standard) FW1 Flex Whip (dimming) Track Eutrac Standard ³ DL Suitable for Damp Locations CCEA Chicago Plenum Downlights (See MR11 spec sheet, pp.98)
	1T5HO F54T5HO	MP Silky Specular Parabolic Louver	RC Rotating Crossbars PM Perimeter Mount	008 8 foot 012 12 foot	BK Black SV Silver SP Specify RAL#	277 347	
M6R2 M60 Recessed Flush End (Flanged Extrusion/Flangeless Endcaps)		SD Satine Lens OD Extra Diffuse Lens	TS 1" Studs (factory installed)	For actual lengths see layout dimensions. For other lengths, configurations indicate nominal length rounded to the next highest foot. Factory will supply layout drawings. Individual fixtures cannot be field joined.			

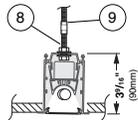
¹Must be low profile ballasts (1 1/2" wide x 1 1/4" high); consult factory for details. ²Available for MP Louver only. ³Consult factory for details.

Mounting Diagrams

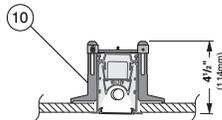
Suspension Clips (SH)



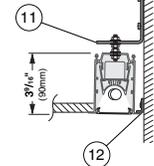
Pre-installed Rod (TS)



Rotating Crossbars (RC)

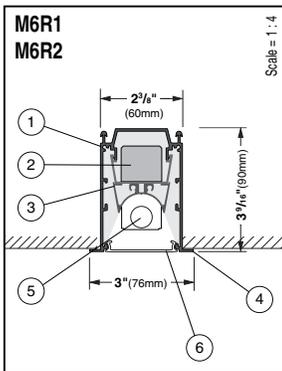
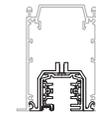


Perimeter Mount (PM)



Track

Track insert including track available for all configurations, consult factory for details.



- Housing** - Continuous, 6063-T5 extruded aluminum profile up to 16 feet long.
- Ballast** - Electronic, high power factor, class "P", type "A" sound rating. Specify 120v, 277v, or 347v. Ballast is factory pre-wired with leads to one end of fixture. Consult factory for ballast options.
- Gear Tray** - Die formed tray with specular aluminum reflector. Gear tray installs as complete electrical unit and is held in place with 1/4 turn latches. It is fully accessible from below ceiling.
- Flange** - 5/16" (8mm) wide flange is part of the main extruded body. Specify continuous flange (M6R1) or flush end (M6R2).
- Lamps** - As noted (by others). Other lamp lengths or wattages available, consult factory.

- Shielding** - Louvers offer excellent glare control in longitudinal, lateral, and all diagonal planes. High quality aluminum louvers and acrylic shielding allow true freedom of layout for today's modern spaces.
- Spring steel suspension clips** - Supplied two places, located nominally every 4 ft. Support wires Supplied and installed by others.
- Pre-installed 1" 1/4-20 Stud** - Attached to fixture every nominal 4 feet.
- Coupling and Threaded Rod to Structure** - Supplied and installed by others.
- Rotating Crossbar** - For inaccessible ceilings, adjustable for ceiling thicknesses from 1/4" to 2". Support required nominally every 4'.

- Steel Wall Bracket and 1/4-20 Rod** - Supplied nominally every 4 ft. (Fasteners to wall and wall anchors by others.)
- Aluminum Wall Bracket** - Secured to wall (fasteners and wall anchors by others) and runs entire length of fixture. Also supplied for width of M6R1 continuous flange fixtures. Allows for 1/8" gap between flange and wall to create shadow line.
- Interior Luminaire Finish** - Standard interior colors are White (WH), Black (BK) and Silver (SV). RAL Classic colors (SP) are available, please specify RAL#.

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 FAX: (845) 691-6749
 www.selux.com/usa
 M6R-01 (v5.0)



In a continuing effort to offer the best product possible, we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product. Specification sheets found at www.selux.com/usa are the most recent versions and supercede all other printed or electronic versions.

Type: L4

M60 Recessed Linear Fluorescent Flanged Extrusion

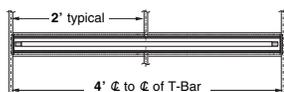


M6R1 and M6R2 Standard Layout Dimensions

M6R1 Recessed - nominal 4 foot individual



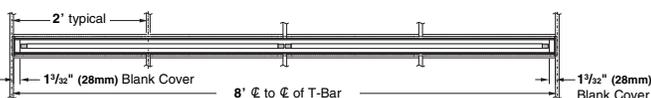
M6R1 Recessed - T-Bar Length - nominal 4 foot individual



M6R1 Recessed - nominal 8 foot individual



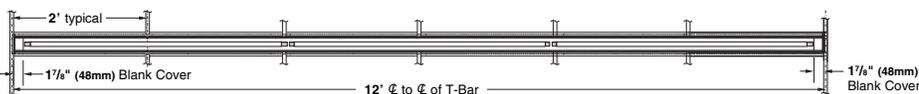
M6R1 Recessed - T-Bar Length - nominal 8 foot individual



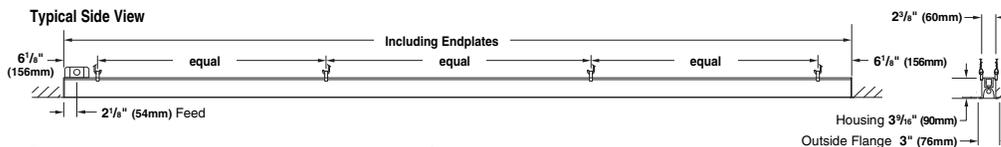
M6R1 Recessed - nominal 12 foot individual



M6R1 Recessed - T-Bar Length - nominal 12 foot individual



Typical Side View



Suspensions supplied spaced nominally every 4 feet.

Fixture supplied with 7/8 knockout located 2 1/8" from end in top of fixture.

	T5 (1 or 2 lamp)			
	M6R1/M6R2 Including Endplates	M6R1 Outside Flange	M6R1/M6R2 - TB Including Endplates	M6R1 - TB Outside Flange
4 foot individual	46.63" (1184mm)	47.28" (1201mm)	47.22" (1199mm)	47.91" (1216mm)
8 foot individual	93.03" (2363mm)	93.72" (2380mm)	95.22" (2419mm)	95.91" (2436mm)
12 foot individual	139.44" (3542mm)	140.13" (3559mm)	143.22" (3638mm)	143.91" (3655mm)

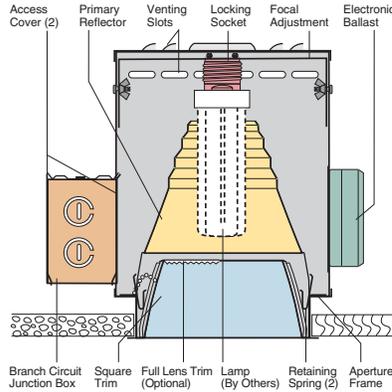
For other lengths, lamping, continuous runs or configurations please specify overall length (in feet), accessories desired and sketch/drawing of configuration. SELUX will detail project drawings upon order and supply submittal drawings for approval. Individual fixtures cannot be field joined. If you have any questions please contact SELUX customer service or applications engineering for assistance (1-800-SELUX-CS).

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 PO Box 1060, 5 Lumen Lane / Highland, NY 12528
 TEL: (845) 691-7723 / FAX: (845) 691-6749
 E-mail: seluxus@selux.com / Web Site: www.selux.com/usa
 M6R1-02 (02/06)

In a continuing effort to offer the best product possible, we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product. Specification sheets found at www.selux.com/usa are the most recent versions and supercede all other printed or electronic versions.

Type: L5A

Section H fronts_UG 12/3/02 9:21 AM Page 14



H8632 One 26 or 32W Triple Tube **H22**
H8642 One 42W Triple Tube

Compact Fluorescent Downlights
6" Square Parabolic Trim

Optics and Applications

The primary reflector has a unique faceted shape designed for triple tube lamps. Distribution is for general use or task lighting. Suitable for damp locations.

Design Features

Steel housings protect and align reflectors and lamps. A safety locking socket prevents lamp fallout. Trims are stabilized to prevent racking and are retained by constant pressure springs. Maximum ceiling thickness 1 1/2". Top or bottom service.

Finish

Structural parts are painted matte black to suppress stray light leaks. Standard trims are anodized Softglow® clear. Special finishes, textures and colors are available.

Trim Textures

Select among different embossed patterns to match the ambiance of the space being illuminated. Refer to Squares brochure for descriptive photos.

Ballasts

Fully electronic, microprocessor controlled with programmed start to assure rated lamp life. Input voltage ranges from 120V through 277V. Power factor .98, starting temperature 0°F (-18°C), THD<10%. Pre-heat start < 1.0 second. End of lamp life protection. Rated for > 50,000 starts.

General

Fixtures are pre-wired, UL and C-UL listed for eight wire 75°C branch circuit wiring. Union made IBEW. Luminaire Efficiency Rating (LER) data is in the photometric directory located in Section Z.

Accessories

- R2 26" support rails. WT White trim flange.
- R5 52" support rails. WHT White complete trim.
- SB Softglow black. BP Ball Peen texture.
- SG Softglow gold. CG Corrugated texture.
- SH Softglow mocha. DS Distressed texture.
- SP Softglow graphite. WV Woven texture.
- ST Softglow titanium. LL Linear spread lens.
- SW Softglow wheat. LP Large prism lens.
- SY Softglow pewter. MP Microprism lens.
- SZ Softglow bronze. DM Dimming ballast.
- BR Bright trim finish. V347 347 volt ballast.
- FC Four cell cross baffle. FR Frosting on lens.
- F Fuse. specify lens type.
- EM Emergency power includes integral charger light and test switch visible through aperture. Battery operation for 90 minutes.

FLT6 Full lens trim, specify lens type, e.g. H8632-FLT6LL.
 WRL Wattage restriction label, specify wattage.

Matching Square Units *

- Incandescent downlights [Pages H7, H8, H9 , H10](#)
- Tungsten halogen downlights [Page H11](#)
- Low voltage downlights [Pages H5, H6](#)
- Metal halide downlights [Pages H26, H27, H28](#)



Dimensions and Lamps

Number	A Depth	B Aperture	C Width	D Length	Lamps
H8632	1 1/4" 286mm	6" sq. 153mm	12" 305mm	14" 356mm	26-32W Triple Tube compact fluorescent
H8642	1 1/4" 286mm	6" sq. 153mm	12" 305mm	14" 356mm	42W Triple Tube compact fluorescent

Brightness

Number	Lamps	85°	75°	65°	55°	45°
H8632	32W PL-T Philips	55	132	224	391	10904
	32W T/E Osram/Syl	32	84	148	247	9212
H8642	42W PL-T Philips	54	147	252	436	15069
	42W T/E Osram/Syl	37	116	231	2369	15908

Data in footcamberts. Photometer readings, Maximum Brightness Method.



Type: L5A

Section H backs_UG 12/3/02 1:43 AM Page 14

H22 H8632 H8642

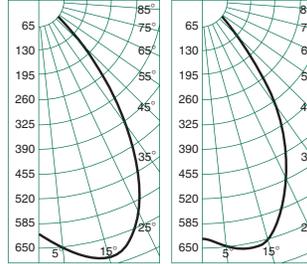
Performance Datachart

Single Unit, Initial Footcandles, 30° Work Plane				Ceiling to Floor		Multiple Units, Initial Footcandles, 30° Work Plane					
H8632 One 32W Philips Read Top Data						Ceiling 80% Walls 50% Floor 20%					
H8632 One 32W Osram Read Bottom Data						Spacing is Maximum Over Work Plane					
Nadir	10°		20°		30°		Spacing	RCR 1	RCR 3	RCR 8	
FC	FC	Diam	FC	Diam	FC	Diam					
20	21	2'	18	4'	11	6'	8'	7'	24	20	14
21	21	2'	17	4'	9	6'	8'	6'	28	24	16
15	15	2'	13	5'	8	8'	9'	8'	17	14	10
15	15	2'	12	5'	7	8'	9'	7'	20	17	11
11	12	3'	10	5'	6	9'	10'	8'	13	11	8
11	11	3'	9	5'	5	9'	10'	8'	15	13	9
9	9	3'	8	6'	5	10'	11'	10'	10	8	6
9	9	3'	7	6'	4	10'	11'	9'	12	10	7
7	7	3'	6	7'	4	11'	12'	11'	8	7	5
7	7	3'	6	7'	3	11'	12'	10'	9	8	5

For 26 Watt x.88

Single Unit, Initial Footcandles, 30° Work Plane				Ceiling to Floor		Multiple Units, Initial Footcandles, 30° Work Plane					
H8642 One 42W Philips Read Top Data						Ceiling 80% Walls 50% Floor 20%					
H8642 One 42W Osram Read Bottom Data						Spacing is Maximum Over Work Plane					
Nadir	10°		20°		30°		Spacing	RCR 1	RCR 3	RCR 8	
FC	FC	Diam	FC	Diam	FC	Diam					
25	27	2'	22	4'	13	6'	8'	6'	30	26	18
30	29	2'	22	4'	12	6'	8'	6'	38	32	23
18	19	2'	16	5'	9	8'	9'	7'	22	19	13
21	20	2'	16	5'	8	8'	9'	7'	27	23	16
14	14	3'	12	5'	7	9'	10'	8'	16	14	10
16	15	3'	12	5'	6	9'	10'	8'	21	17	12
11	11	3'	9	6'	5	10'	11'	10'	13	11	7
12	12	3'	9	6'	5	10'	11'	9'	16	13	10
9	9	3'	7	7'	4	11'	12'	11'	10	9	6
10	16	3'	7	7'	4	11'	12'	10'	13	11	8

Candlepower Distribution



H8632 32W Philips Eff. 39% S/M 1.19

H8632 32W Osram Eff. 36% S/M 1.07

Candelas

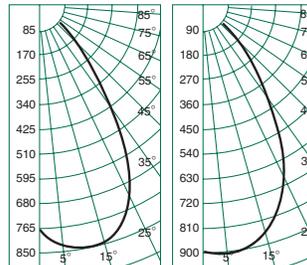
o	P 32W		O 32W	
	2400*	2400*	2400*	2400*
0	620	629	620	629
5	643	650	643	650
10	678	663	678	663
15	692	648	692	648
20	673	602	673	602
25	615	529	615	529
30	517	434	517	434
35	389	339	389	339
40	283	252	283	252
45	174	166	174	166
50	41	81	41	81
55	15	25	15	25
60	11	14	11	14
65	0	10	0	10
70	0	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

o Vertical Angles
* Initial Lamp Lumens

Coefficients of Utilization

Ceiling	80%				70%				50%				30%				0
	70	50	30	10	50	10	50	10	50	10	50	10	50	10	0		
Wall %	Zonal Cavity Method - Floor Reflectance 20%																
RCR	1	.44	.43	.42	.41	.42	.40	.40	.39	.39	.38	.38	.36	.34	.33	.36	
RCR	2	.42	.40	.38	.36	.39	.36	.38	.35	.36	.34	.31	.30	.28	.25	.34	
RCR	3	.39	.36	.34	.33	.36	.32	.35	.32	.34	.31	.28	.27	.24	.23	.30	
RCR	4	.37	.34	.31	.30	.33	.29	.32	.29	.32	.29	.28	.27	.24	.23	.28	
RCR	5	.35	.31	.29	.27	.31	.27	.30	.26	.29	.26	.25	.24	.23	.22	.26	
RCR	6	.33	.29	.26	.25	.29	.24	.28	.24	.27	.24	.23	.22	.21	.24	.23	
RCR	7	.31	.27	.24	.23	.27	.22	.26	.22	.26	.22	.21	.20	.19	.22	.21	
RCR	8	.29	.25	.22	.21	.25	.21	.24	.21	.24	.20	.20	.19	.18	.20	.19	
RCR	9	.28	.23	.21	.19	.23	.19	.23	.19	.22	.19	.18	.17	.16	.19	.18	
RCR	10	.26	.22	.19	.18	.22	.18	.21	.18	.21	.18	.17	.16	.15	.18	.17	

H8632 Osram 32W Triple Tube x.93
H8642 Philips and Osram 42W Triple Tube x.86



H8642 42W Philips Eff. 34% S/M 1.14

H8642 42W Osram Eff. 34% S/M 1.01

o	P 42W		O 42W	
	3200*	3200*	3200*	3200*
0	770	698	770	698
5	814	805	814	805
10	849	903	849	903
15	850	853	850	853
20	813	797	813	797
25	724	682	724	682
30	588	550	588	550
35	436	408	436	408
40	310	297	310	297
45	176	195	176	195
50	38	86	38	86
55	17	17	17	17
60	13	12	13	12
65	0	0	0	0
70	0	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

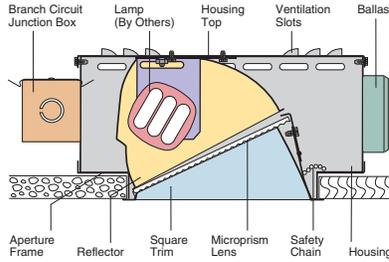
o Vertical Angles
* Initial Lamp Lumens

Notes

- For microprism spread lens multiply data x.88.
- All data with standard trim, Softglow® clear.
- Datachart degree headings measure one side from nadir. Diameter data includes both sides. Therefore the 20° column value describes a 40° pattern diameter at the work plane 30" above the floor. Footcandle values are at the diameter edge.
- Datachart spacing is rounded off to the nearest foot.
- Data by IES methods. Compact fluorescent data vary due to lamp lumen differences, power input, burning position, ambient temperature and ballast characteristics. A modification factor should be applied.
- Colored trim multipliers: Gold x .90, Wheat x .85, Mocha x .80, Pewter x .80, Graphite x .75, Titanium x .75, Bronze x .70, Black x .70.

Type: L5B

Section H fronts_UG 12/3/02 9:22 AM Page 27



H8653

H37

Wall Washer
One 26-32-42W Triple Tube Compact Fluorescent Lamp
6" Parabolic Trim

Optics and Applications

Primary and kicker reflectors work with a microprism spread lens to produce wide lateral spread, light close to the ceiling and a uniformly illuminated wall. The pattern is devoid of hot spots or striations. Suitable for damp locations. Use to wash walls or accentuate objects of special interest.

Design Features

The faceted compound curve reflector is designed for triple tube lamps. The trim is stabilized to prevent racking and is held to the ceiling by constant pressure springs. After installation, the trim and optical assembly may be rotated 360° in 90° increments if orientation to the wall is incorrect. Maximum ceiling thickness 7/8". Top or bottom service.

Finish

Housing and structural parts are painted matte black to suppress stray light leaks. Standard trim is anodized Softglow® clear. Special finishes, textures and colors available, see below under Accessories.

Trim Textures

Textured trims create a subtle new aperture appearance. Select among different embossed patterns to match the ambiance of the space being illuminated. Refer to Squares brochure for descriptive photos.

Ballast

Fully electronic, microprocessor controlled with programmed start to assure rated lamp life. Input voltage ranges from 120V through 277V. Operates 26W, 32W or 42W triple tube lamps interchangeably. Power factor .98, starting temperature 0°F (-18°C), THD<10%. Pre-heat start < 1.0 second End of lamp life protection. Rated for > 50,000 starts.

General

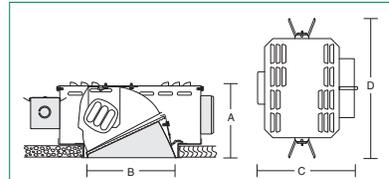
Fixtures are pre-wired, UL and C-UL listed for eight wire 75°C branch circuit wiring. Union made IBEW. Luminaire Efficiency Ratings (LER) do not apply to wall washers.

Accessories

- R2 26" support rails.
- R5 52" support rails.
- SB Softglow black.
- SG Softglow gold.
- SH Softglow mocha.
- SP Softglow graphite.
- ST Softglow titanium.
- SW Softglow wheat.
- SY Softglow pewter.
- SZ Softglow bronze.
- F Fuse.
- DM Dimming ballast. Specify watts and volts.
- EM Emergency power includes integral charger light and test switch visible through aperture. Battery operation for 90 minutes.
- WRL Wattage restriction label, specify wattage. See Squares brochure for more accessories data.
- WT White trim flange.
- WHT White complete trim.
- BP Ball Peen texture.
- CG Corrugated texture.
- DS Distressed texture.
- WV Woven texture.
- BR Bright trim finish.
- LL Linear spread lens.
- LP Large prism lens.
- FR Frosting on lens.
- V347 347 volt ballast.



Dimensions and Lamps



Number	A Depth	B Aperture	C Width	D Length	Lamps
H8653	5 1/2" 140mm	6" sq. 153mm	13 1/2" 343mm	19" 483mm	26-32-42W Triple Tube compact fluorescent

Matching Square Units *

Directional downlights [Pages H5, H6, H9, H24, H27](#)
 Straight downlights [Pages H7, H8, H10, H11, H22, H23, H26, H28](#)

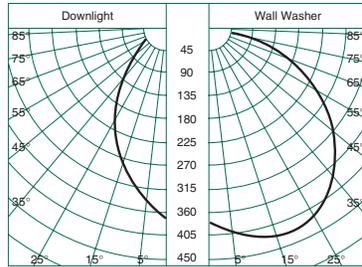


Type: L5B

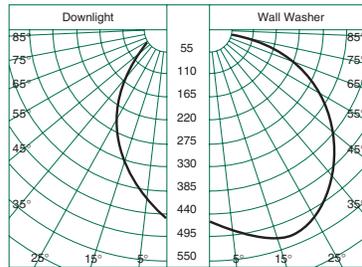
Section H backs_UG 12/3/02 1:51 AM Page 27

H37 H8653

Candlepower Distribution Curves



H8653 32W PL-T Philips



H8653 42W PL-T Philips

Brightness

Number	Lamps	85°	75°	65°	55°	45°
H8653	32W PL-T Philips	38	153	286	1471	2552
	42W PL-T Philips	77	230	464	1988	3270
	32W T/E Osram	54	134	284	1543	2453
	42W T/E Osram	50	180	356	1633	2690

Data in footcandlemeters. Photometer readings. Maximum Brightness Method. See note 7.

Multiple Units Footcandles

From Ceiling	2' from wall		3' from wall		4' from wall							
	Centers		Centers		Centers							
	C/L	Mid	C/L	Mid	C/L	Mid						
1'	40	33	35	19	13	10	12	5	4	5	2	
2'	42	41	32	26	20	19	17	12	10	9	9	4
3'	31	31	22	20	19	19	15	13	12	11	9	6
4'	22	21	15	14	16	16	12	11	11	11	8	6
5'	15	15	10	10	13	12	10	9	9	9	7	6
6'	11	11	7	7	10	10	7	7	8	8	6	5
7'	8	8	6	5	8	8	6	6	7	7	5	4
8'	6	6	4	4	6	6	5	5	6	5	4	4
9'	5	5	3	3	5	5	4	4	5	4	3	3
10'	4	4	3	3	4	4	3	3	4	4	3	3

H8653 32W PL-T Philips

From Ceiling	2' from wall		3' from wall		4' from wall							
	Centers		Centers		Centers							
	C/L	Mid	C/L	Mid	C/L	Mid						
1'	52	46	44	27	16	14	15	8	7	5	6	2
2'	54	54	40	34	26	25	22	16	13	12	11	6
3'	39	40	27	26	25	24	19	17	15	14	12	8
4'	27	27	18	18	20	20	15	15	14	14	10	8
5'	19	19	13	13	16	16	12	12	12	12	8	8
6'	14	14	9	9	13	12	9	9	10	10	7	7
7'	10	10	7	7	10	10	7	7	8	8	6	6
8'	8	8	5	5	8	8	6	6	7	7	5	5
9'	6	6	4	4	6	6	5	5	6	6	4	4
10'	5	5	3	3	5	5	4	4	5	5	3	3

H8653 42W PL-T Philips

Notes

- All data calculated with Softglow® clear trims and a microprism spread lens.
- If colored trims are required, only the lens trim will be tinted. Primary and kicker reflectors are always clear Alzak for maximum output and true color rendition. Multiple units footcandles are correct as reported above.
- Colored trim multipliers: Gold x .90, Wheat x .85, Mocha x .80, Pewter x .80, Graphite x .75, Titanium x .75, Bronze x .70, Black x .70.
- Above data measure output of the wall washers only. No contribution from adjacent downlights or ceiling, floor or wall reflectances is included. Total illumination on the wall will increase with the contribution from other sources.
- Data are cosine corrected to the plane of the wall. Uncorrected data are much higher and depend upon the angle of incidence to the wall which varies with the mounting distance from the wall.
- Kurt Versen wall washers minimize hard shadow lines at the ceiling. Intensity increases gradually to just above eye level. The illuminated field is uniform and devoid of hot spots, striations and spikes.
- Brightness data from the Average Luminance Method are inaccurate for downlights. They are theoretical calculations for large surfaces such as troffer lenses. We recommend the stricter standard of Maximum Brightness Method point data from direct photometer readings. They approximate what the human eye perceives when evaluating glare. For more information refer to Z section brochure Z1.

 Kurt Versen Company, Westwood, New Jersey

Type: L6

CUSTOM LUMINAIRE

Type: L7



PROJECT NAME:

TYPE:

MODEL: **AX**

SUBMITTAL APPROVED BY:

DATE:

[Set Field To Current Date](#)

PRODUCT | AX SERIES

Adjustable Linear Fluorescent - Patent Pending
 AX T5 Performance Linear Cove System

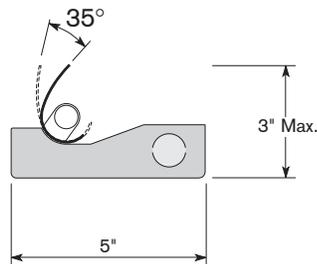
HOW TO SPECIFY | Product Code

[Reset Product Code](#)

[Reset Entire Form](#)

AX	LAMP	LAMP CONFIG.	VOLTAGE	BALLAST	LUMINAIRE LENGTH	OPTIONS
AX - T5	28 - 28 watt T5 21 - 21 watt T5 14 - 14 watt T5	S2 - 2 lamps (Tandem) S1 - 1 lamp	U - Universal 120 through 277V <i>Please Specify Voltage For Dimming</i> 1 - 120V 2 - 277V	E - TM Electronic HPF D1 - TM Digital Dimming DALI compatible D3 - TM Lutron Eco-10 TM	92 - 28 watt / S2 / 92.5 in. 46 - 28 watt / S1 / 46.25 in. 69 - 21 watt / S2 / 69 in. 34 - 21 watt / S1 / 34.5 in. 22 - 14 watt / S1 / 22.75 in.	EM - Emergency TM Ballast 4' nominal lamp only

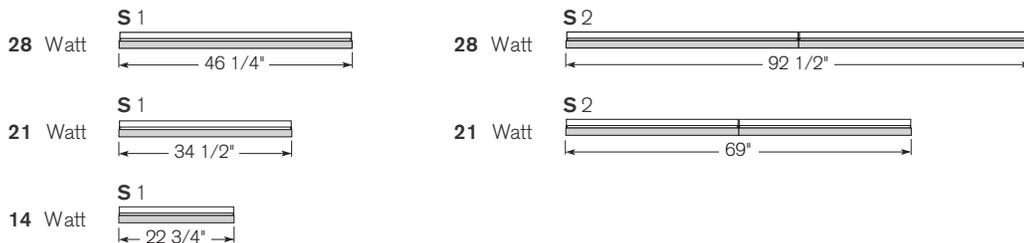
LUMINAIRE DIMENSIONS



Recommended » Minimum Cove Dimensions
 For Zero Degree Line Of Sight

Distance From Ceiling To Cove	Width	Cove Facade
TM T5 HO-18"	8" TM	3"
TM T5-12" TM		
TM T8-10"		

LUMINAIRE LENGTHS



Type: L7



PRODUCT | AX SERIES

Adjustable Linear Fluorescent - Patent Pending AX T5 Performance Linear Cove System



PRODUCT SPECIFICATIONS

ELECTRICAL

Integral electronic HPF Class P ballast; Thermally protected and has end of life protection for T5 lamps; Sound Rating - Class A

Supplied with 12 gauge through wires

Use 90°C for supply wire

Channel cover removes for access to ballast

Consult sales representative or factory for dimming and emergency ballast options

Compatible dimming controls provided by others

MATERIALS & HOUSING

Extruded aluminum asymmetric reflector adjusts 35 degrees and locks into place

Die cast end caps allow sockets to be back to back eliminating shadows

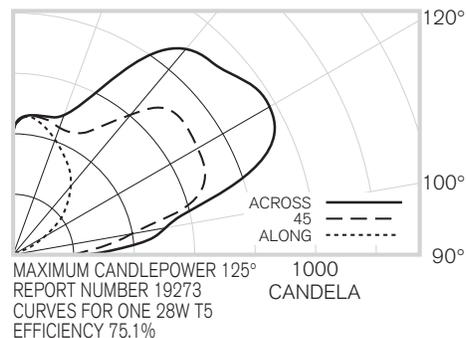
Die-formed 20 gauge cold rolled steel housing

FINISH

Standard finish is electrostatically applied white powder coat; Thermally cured to an enamel finish with 85%+ reflectivity

LISTINGS

UL & CUL listed damp locations



ADDITIONAL PROJECT NOTES:



Type: L8

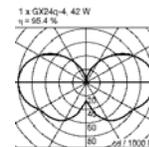


PUBLIC
 satin nickel
 glass tube clear
 acrylic tube satin
 with electronic ballast
 120 / 277 VAC

contact factory for
 dimming options
 mounting note:
 canopy to fit
 standard junction box



PUBLIC



1 x GX24q-4, 42 W
 16991.06/2830

2 x 2G11, 18 W
 26982.06/2831

2 x 2G11, 24 W
 26983.06/2832

glass tube clear glass tube satin
 1 x T10 halogen medium base
 max. 100 W, 120 VAC
 16149.06/2830

glass tube clear glass tube satin
 1 x T10 halogen medium base
 max. 150 W, 120 VAC
 16150.06/2831

glass tube clear glass tube satin
 1 x T10 halogen medium base
 max. 150 W, 120 VAC
 16151.06/2832

see chapter
wall lights

see chapter
ceiling lights

www.inter-lux.com

Type: L9

Recessed wall luminaires · unshielded for wall and steps

Housing: Constructed of die-cast and extruded aluminum with integral wiring compartment. Mounting tabs provided.

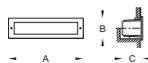
Enclosure: One piece die-cast aluminum faceplate. 1/8" thick, clear tempered glass with translucent white ceramic coating. Faceplate is secured by two (2) socket head, stainless steel, captive screws threaded into stainless steel inserts in the housing casting. Continuous high temperature O-ring gasket for weather tight operation.

Electrical: (Fluorescent) Lampholder; type GX23 (13W) rated 75W, 250V. Ballasts are magnetic, available 120V or 277V - specify. Through Wiring: All units are suitable for a maximum of four (4) No. 12 AWG conductors (plus ground) suitable for 75°C. Two 7/8" knockouts provided for 1/2" conduit.

Finish: Available in five standard BEGA colors: Black (BLK); White (WHT); Bronze (BRZ); Silver (SLV); Eurocoat™ (URO). To specify, add appropriate suffix to catalog number. Custom colors supplied on special order.

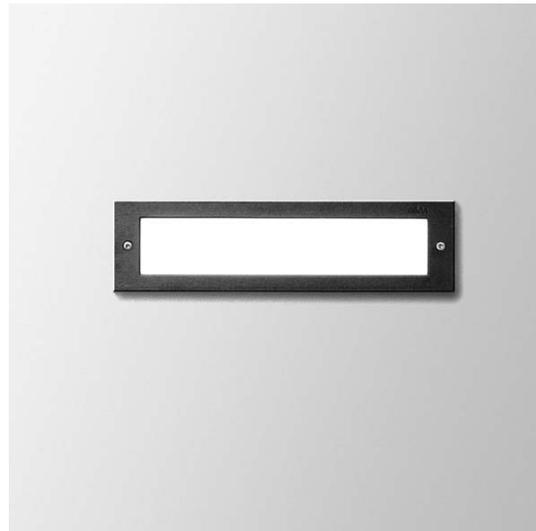
U.L. listed, suitable for wet locations and for installation within 3 feet of ground. Suitable for all types of construction including poured concrete. Protection class: IP 64.

Type:
 BEGA Product:
 Project:
 Voltage:
 Color:
 Options:
 Modified:



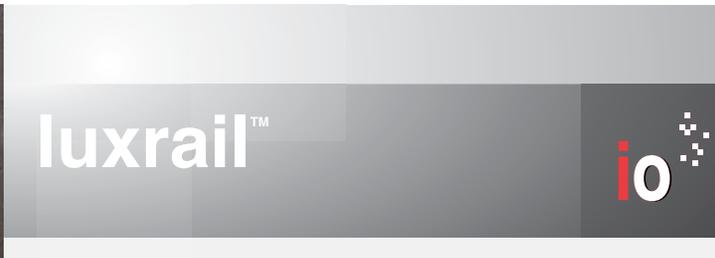
Recessed luminaires · unshielded

	Lumen	A	B	C
2287 P ADA	1 13W CF twin-2p 825	1 13/16	2 9/16	4 1/4



BEGA-US 1000 BEGA Way, Carpinteria, CA 93013 (805) 684-0533 FAX (805) 566-9474 www.bega-us.com
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Type: L10



Application

ANSI and ADA compliant, **luxrail** is an indoor/outdoor LED-based handrail that delivers functional illumination. Two intensities may be specified: standard output and high output. The standard light output version delivers illuminance levels appropriate for exterior applications (2 footcandles at grade) as well as for dark interior environments with low ambient illumination levels, (e.g., theatres, themed environments). The high output version delivers illuminance levels applicable to interior environments – providing in excess of 10 footcandles along the path of egress (ANSI required for stair treads). Independent photometric test reports and IES Format data are available at www.ioighting.com.

luxrail's standard handrail gripping surfaces are circular in cross section and meet 2004 ADAAG (Americans with Disability Act Accessibility Guidelines). Patented optical assemblies deliver 10°, 45° and 65° beam spreads. The 45° and 65° beam patterns are most suitable for illuminating pathways, while the 10° beam spread offers accent lighting to optional glass or stainless steel cable railing infills. Reference page 41 (**luxrail** brochure) for information regarding infill options. **io** ensures that each LED is driven with the proper current and voltage, which enables the average rated life to be 50,000 hours at 70% of lamp lumen output. Ambient temperature surrounding the fixture shall not exceed 120°F (48.9°C).

Light Output

Two luminous intensities are available for white light. IES format files may be obtained from the factory or downloaded from www.ioighting.com.

Standard Output:

3000K White: 34 lms/ft
5000K White: 40 lms/ft

High Output:

3000K White: 170 lms/ft
5000K White: 230 lms/ft

Construction

luxrail may be post mounted or wall mounted. Mounting hardware (post or wall) is typically required up to 5' O.C., depending on the handrail alloy. Final post and wall bracket spacing **must be** determined by a licensed architect or structural engineer. **luxrail** is available in stainless steel and aluminum. The lighting fixture component of the **luxrail** is a stand alone unit and is available in incremental nominal lengths that range from 6" to 60". Vandal resistant access chamber allows units to be removed for maintenance purposes.

All handrail component parts are engineered for quick installation. Field welding or cutting is typically not required. All parts are prefabricated to field dimensions and are assembled in the field with mechanical connection or epoxy.

The light fixture's housing is made of a light weight, yet durable aluminum, providing the recommended heat sink requirements for the LEDs. Housing, patented optical assembly and stainless steel end caps are bonded to prevent water infiltration.

Electrical

luxrail houses a low voltage LED-based light fixture that is integrated into the underside of the handrail. It comes complete with the linear light fixture installed in the handrail. 24 volt 100 watt power supplies are provided as a standard. See daisy chain and remote distance requirements in chart on the lower left corner of this specification sheet.

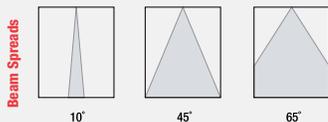
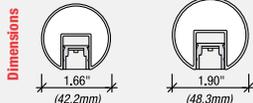
Power supply and dimming module must be specified separately. For detailed information, see **luxrail** brochure or download the power supply specification sheet from www.ioighting.com.

Power Consumption

Standard Output: 2.1 w/ft

High Output: 7.6 w/ft

Power consumption does not include power supply losses. Consult **io** driver specification sheets (at www.ioighting.com) for losses associated with each driver option.



Standard Output			
TYPE	SUPPLIES	REMOTE DISTANCE	
24v100w	up to 35'-0" (10.7m)	7'-0" (2.1m)	w/22AWG
	(2) RUNS UP TO	18'-0" (5.5m)	w/18AWG
	49' (14.9m)		
	w/ (1) RUN	46'-0" (14m)	w/14AWG
	NTE 35'-0" (10.7m)	71'-0" (21.6m)	w/12AWG

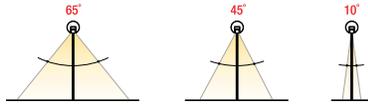
High Output			
TYPE	SUPPLIES	REMOTE DISTANCE	
24v100w	up to 12'-0" (3.6m)	7'-0" (2.1m)	w/22AWG
		18'-0" (5.5m)	w/18AWG
		46'-0" (14m)	w/14AWG
		71'-0" (21.6m)	w/12AWG



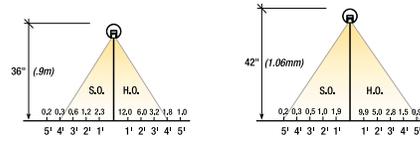
Type: L10

luxrail

BEAM SPREAD OPTIONS



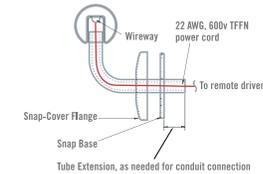
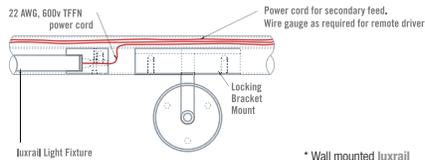
LIGHT OUTPUT - 65 DEGREE WARM WHITE



For Metric Conversion	1'	2'	3'	4'	5'
	.3m	.6m	.9m	1.2m	1.5m

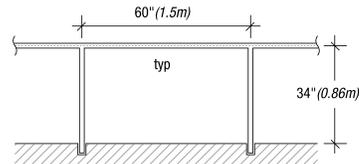
Light Output / Distributions

WALL MOUNT DETAILS*



* Wall mounted luxrail may be mounted to new or existing guardrail (by others).
Post and wall bracket spacing must be provided by a licensed architect or structural engineer.

POST MOUNT APPLICATION



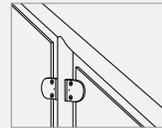
Mounting / Infill Options



PM (post mounted)



WM (wall mount intermediate)



Glass infill
(glass provided by others)



Stainless steel cable infill

Order Code

0	06	2	3	4	5	6	7	8	9	10
io	1									

1. PRODUCT FAMILY

06 luxrail

2. ALLOY / FINISH

SSS Stainless Steel Satin
SSP Stainless Steel Polished
CAA Clear Anodized Aluminum ⁽¹⁾

3. SIZE

1 1.66" O.D. (1/4" pipe size) ⁽²⁾
[available for SS & CAA]
2 1.90" O.D. (1/2" pipe size)
[available for SS & CAA]

Footnotes

1. Power Supply Specification Sheet may be downloaded from www.iolighting.com.
2. Each handrail application will be somewhat custom to accommodate varying field conditions and design requirements. Shop drawings will be required to manage specifics of each handrail section.
3. White light variance between LEDs within a single fixture will not exceed +/- 200K.
4. High Output only - 7.6iwft.
5. Aircraft cable available for flat surfaces only.
6. Elevation drawings required.
7. 1.66" OD, post mounted railings are not available in aluminum. Stainless steel only.

4. MOUNTING

PM Post Mounted ⁽³⁾
WM Wall or Guard Rail Mounted

5. INFILL

AC Aircraft Cable ⁽⁵⁾
GL Glass (provided by others)
C Custom
NR Not Required

6. LIGHT DISTRIBUTION

10 10 Degree
45 45 Degree
65 65 Degree
NI Handrail only (not illuminated)

7. LIGHT COLOR

3k Warm White ⁽⁶⁾
5k Cool White ⁽⁶⁾
3kHO Warm White ⁽⁶⁾
5kHO Cool White ⁽⁶⁾
R Red ⁽⁶⁾
G Green ⁽⁶⁾
B Blue ⁽⁶⁾

8. LENGTH

Provide overall length of each handrail section. Reference Footnote #2⁽⁸⁾

9. VOLTAGE / DIMMING

1 120v
2 277v
3 120v w/dim
4 277v w/dim
5 Other

10. SPECIFY DRIVER / DIMMING⁽¹⁾

Note: If left blank, io will supply 100 watt drivers. Download Power Supply specification sheet from www.iolighting.com

For Metric Conversion	1"	1"	1"
	25.4mm	2.54cm	0.3m



io Lighting 370 Corporate Woods Parkway Vernon Hills, IL 60061-3107 T 847.735.7000 F 847.735.7001 E info@iolighting.com W iolighting.com

2007 - io Lighting reserves the right to change specifications for product improvement without notification

Type: L11

Recessed wall luminaires with unshielded light

Housing: Die-cast aluminum with integral wiring compartment.

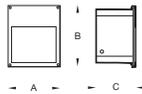
Enclosure: One piece die-cast aluminum faceplate. 1/8" thick, tempered glass; clear with white translucent ceramic coating. Faceplate is secured by four (4) socket head, stainless steel, captive screws threaded into stainless steel inserts in the housing casting. Continuous high temperature O-ring gasket for weather tight operation.

Electrical: Compact fluorescent socket (26, 32, and 42 W multi-watt socket) GX24q-3, GX24q-4 rotary lock lampholder rated 75 W, 600 V. Compact fluorescent ballasts are electronic universal voltage, 120V through 277 V. Through Wiring: Maximum of four (4) No. 12 AWG conductors (plus ground) suitable for 75° C. Two 7/8" knockouts provided for 1/2" conduit.

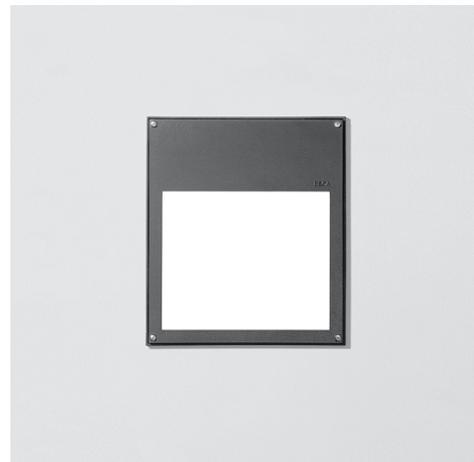
Finish: Available in five standard BEGA colors: Black (BLK); White (WHT); Bronze (BRZ); Silver (SLV); Eurocoat™ (URO). To specify, add appropriate suffix to catalog number. Custom colors supplied on special order.

U.L. listed, suitable for wet locations and for installation within 3 feet of ground. Suitable for all types of construction including poured concrete. Protection class: IP 64.

Type:
 BEGA Product:
 Project:
 Voltage:
 Color:
 Options:
 Modified:



Recessed luminaires - unshielded					
	Lamp	Lumen	A	B	C
2850 P	1 42W CF triple-4p	3200	9	9 7/8	6 5/8



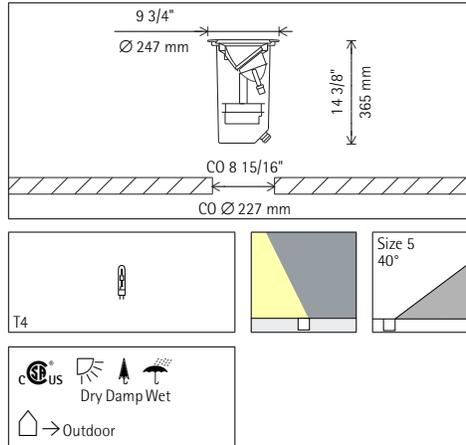
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Type: L12

ERCO

Tesis In-ground luminaire

Lens wallwasher for metal halide lamps



33715.023 Reflector silver
T4 39W G8.5 3300lm
ECCG

Product description

Housing: corrosion-resistant, cast aluminum, No-rinse surface treatment. Black double powder-coated. Lampholder 360° rotation. Mounting by means of an adjustable bar. Clamp extension 3/16"-1 37/64" / 5-40mm.

Electronic control gear 120V/277V, 60Hz. Cable, L 39" / 1m.

Wallwasher reflector: aluminum, silver anodized.

Low brightness reflector: aluminum, silver, specular anodized, with wallwasher lens. Cut-off angle 40° from horizontal. Without spill light.

Screw-fastened cover ring with flush safety glass: corrosion resistant stainless steel. Safety glass: 1/2" / 12mm, clear.

Can be driven over by vehicles with pneumatic tyres. Load 10116lb.wt / 45kN.

Suitable for wet location (IP68): dust-proof.

Weight 13.89lbs / 6.30kg
Temperature on the cover glass 150°F / 65°C

ERCO Lighting Inc.
160 Raritan Center Parkway
Suite 10
Edison, NJ 08837
USA
Tel.: +1 732 225 8856
Fax: +1 732 225 8857
info.us@erco.com

Technical Region: 120V/277V, 60Hz
Edition: 12.02.2008
Please download latest version from
www.erco.com/33715.023

Type: L12

ERCO

Tesis In-ground luminaire

Planning Data

Illuminance (fc)

Specifications:
 Number of luminaires n > 5
 Light loss factor 0.80
 Without indirect component
 Without peripheral area
 Wall height (ft) 12
 T4 39W G8.5 3300lm

Offset from wall (ft)	4	4	5	5	5	5	6	6
Luminaire spacing (ft)	4	5	5	5	5	6	6	6
Distance from ceiling (ft)	below the luminaire	between the luminaires						
12.000	8	7	7	6	8	7	7	6
11.000	10	8	8	7	10	9	8	7
10.000	12	10	10	9	11	10	9	9
9.000	15	13	12	11	12	11	10	10
8.000	17	15	14	13	13	12	11	10
7.000	19	18	16	15	13	12	12	10
6.000	21	19	17	15	13	11	11	9
5.000	20	18	18	14	10	9	9	7
4.000	16	14	14	10	6	6	6	4
3.000	9	8	8	6	3	3	3	2
2.000	3	3	3	2	1	1	1	1
1.000	0	0	0	0	0	0	0	0
0.000	0	0	0	0	0	0	0	0

Type: L12

ERCO

Tesis In-ground luminaire

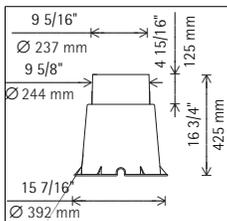
Accessories



33950.000
 Domed glass
 To prevent accumulation of dirt.
 Load: 1125lb.wt / 5kN.
 Cannot be driven over by vehicles.



33962.000
 Housing for recessed mounting
 Corrosion-resistant cast aluminum,
 No-Rinse surface treatment. Black
 double powder-coated. 2 cable en-
 tries.
 Weight 12.79lbs / 5.80kg



Type: L13

**louis
poulsen**

Nimbus Power LED 223

inground & onground



Weblink
192

Project page
268, 306, 352

Louis Poulsen Lighting exhibition 2006, Frankfurt, Germany. Architects: Julien de Smedt / JDS, Copenhagen, Denmark. Lighting Designer: Louis Poulsen Lighting IMD. Photo: Udo Kowalski

Design
Louis Poulsen Lighting A/S

Concept
Nimbus Power LED with 9 light emitting diodes with a nominal load of 9W provides color, accent and marker illumination, and sets scenes, creating drama and highlighting architectural features.

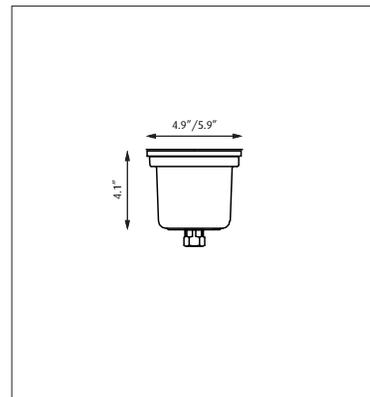
Finish
Stainless steel.

Material
Sleeve: Marine grade 316 stainless steel. Glass: Tempered anti-slip glass or tempered clear glass. Top plate: Marine grade 316 stainless steel. Housing: Anodized and powder coated paint containing PTFE, die cast aluminum.

Mounting
Sleeve: Recommended mounting in optional installation sleeve. Inground: Suitable for burial in earth/gravel or cast into concrete.

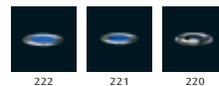
Weight
Max. 7 lbs.

Label
cUL, Wet location. IBEW.



Product code	Light source	Voltage	Finish	Diff./Encl./Glass	Top plate style	Options
NIM-PWR	9 LED Amber 9 LED Blue 9 LED White	120V 277V	ST STEEL	ANTI-SLIP CLEAR	BEVELED STRAIGHT	W/ SLEEVE W/O SLEEVE

Info notes:
I. Provided with integral pre-assembled LED board and 120V or 277V transformer.
II. The comparable EU version has the following classification: Ingress Protection Code: IP67.



Type: L14

Ritorno® Round Symmetrical



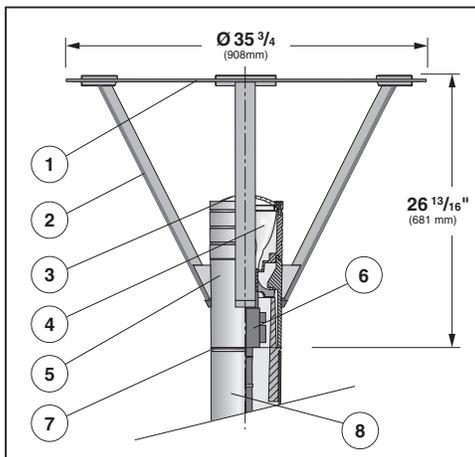
Project: _____
Type: _____ **Qty:** _____

RRS - _____ - _____ - _____ - _____ - _____ - **L** - _____
 Fixture Series Mounting Lamp Type/Wattage Finish Voltage Height Options Options

LAMPS SUPPLIED WITH FIXTURE EXCEPT FOR NOL OPTION. SEE PAGE 2 FOR LAMP DETAILS.

Series	Mounting	Lamp Type / Wattage				Finish	Voltage	Height	Options
RRS Ritorno® Round Symmetrical	1 Single W Wall Mount	Metal Halide	HPS	T6 Metal Halide		WH White	120	RP12 12'(3.7m) (not applicable for wall mount) or specify custom	L Lamp Supplied NOL ⁵ No Lamp Supplied REC GFCI Receptacle (pole mount only)
		H050 ¹ 50w H070 70w H100 100w H150 150w	S050 ¹ 50w S070 70w S100 100w S150 ² 150w	H070T6 70w H150T6 150w	BK Black BZ Bronze SV Silver SP Specify RAL#	208 240 277 347			
RRS LZ ⁴ Ritorno® Round Symmetrical LEED Zone II Certified				QL Induction				Consult factory for custom heights.	Consult factory for other options.
				QL85 ³ 85w QL165 ³ 165w					

¹Not available with 347v. ²Only available with 55v lamps. ³Only available in 120v and 277v. ⁴Only available in 277v. ⁵Not available for QL lamps. ⁶Only available with T6 lamps.



1. Reflective Shade - $\text{Ø } 35 \frac{3}{4}$ " (908mm), minimum $3/16$ " (4.7mm) thick aluminum reflector shade painted white for maximum reflectivity. Supplied with drip groove around perimeter, to prevent rain marks on underside. Shade attached to fixture arms with low profile stainless steel hardware.

2. Fixture Arms - Three natural, marine grade stainless steel with bead-blasted finish, rigidly attach reflector shade to pole fitter.

3. Lamp Cover - Heat-tempered convex lens protects lamp and reflector assembly. Continuous molded silicone gasket creates sealed optic chamber for weather proofing, dust and insect control.

Door pivots open from lamp chamber for relamping. Three captive stainless steel screws secure lamp cover in position.

4. Lamp - One coated, base down, medium base ED-17 metal halide or high pressure sodium up to 150w, 70w or 150w ceramic G12 base T6 metal halide (830 - 3,000° K); or 85w or 165w QL induction lamp (840 - 4,000° K). Other lamps/colors available, consult factory. Lamp supplied with fixture unless otherwise specified.

5. Optic Chamber - Die cast aluminum optic chamber houses highly specular precision reflector & 4KV pulse rated medium base socket and lamp. Secures to pole fitter with quarter turn mechanism, locked in place with a single screw. Optic chamber is removable from pole fitter for ballast access, without the necessity of re-moving the fixture head from the pole.

6. Ballast - A high-efficiency, pulse start, core and coil ballast factory wired to socket. Removable ballast bracket is secured to optic chamber for ease of maintenance. Consult factory for more detailed ballast information.

7. Pole Fitter - Die cast aluminum fitter secures fixture arms and reflective shade to pole. Tapered to continue lines from pole.

8. Pole - Pole to be aluminum and taper from 5" diameter at the bottom to 7" diameter at the top. Pole wall thickness to be minimum 0.156 thick, supplied with a 3" x 5" hand hole, with cast 356 aluminum tempered to a T6 condition reinforced frame, with integral ground lug connection and gasketed flush fitting door.

9. Base Cover - (not shown) Standard two-piece base cover is made from die-cast 356 alloy aluminum which is heat treated to produce a T6 temper, measuring $4 \frac{1}{2}$ " (115mm) height by $12 \frac{1}{2}$ " (316mm) diameter.

Exterior Luminaire Finish - SELUX utilizes a high quality Polyester Powder Coating. All SELUX luminaires and poles undergo a five stage intensive pretreatment process where product is thoroughly cleaned, phosphated and sealed. SELUX powder coated products provide excellent salt and humidity resistance as well as ultra violet resistance for color retention. All products are tested in accordance with test specifications for coatings from ASTM and PCI. Standard exterior colors are White (WH), Black (BK), Bronze (BZ), and Silver (SV). RAL colors (SP) are available, please specify RAL#.

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 TEL (845) 691-7723
 FAX (845) 691-6749
 www.selux.com/usa
 RRS-0209-01 (SS-v4.0)

NRTL Listed (i.e. UL, CSA)



In a continuing effort to offer the best product possible, we reserve the right to change, without notice, specifications or materials that in our opinion will not alter the function of the product. Specification sheets found at www.selux.com/usa are the most recent versions and supercede all other printed or electronic versions.

Type: L14

Ritorno® Round Symmetrical



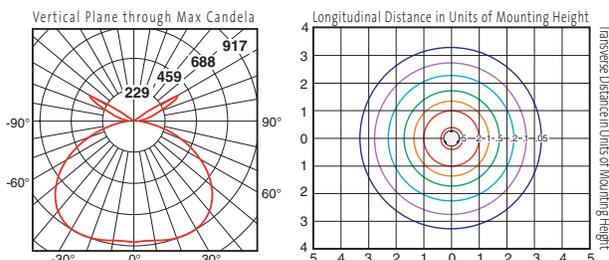
Photometry

150w MH

Catalog # RRS-1-H150
Report # ITL-15625

- Maximum candela of 917 at 25° and -25° from vertical.
- IES classification = Type V Semi-Cutoff.

DOWNLOAD IES FILE:
http://www.selux.com/cms/products/external/ies/ritorno_ra/RRS-1-H150.zip



HID Lamp Prorate Table					
High Pressure Sodium			Metal Halide		
Wattage	Factor	Initial Lumens	Wattage	Factor	Initial Lumens
50	0.29	3800	50	0.30	4000
70	0.45	5950	70	0.45	6000
100	0.66	8800	100	0.68	9000
150	1.12	15000	150	1.00	13300

Conversion Chart	
Values based on 12' mounting height.	
Mounting Height	Multiply
10'	1.10
12'	1.00
14'	0.93
16'	0.87

Lamps Supplied with Fixture						Other color temperatures available upon request						
Catalog Number	Description	Bulb	Operating Position	Base	Lamp Finish	Lamp Color	ANSI Designation	Initial Lumens	Mean Lumens	CRI	CCT (K)	Life (hours)
H050	50 Watt	ED17	Universal	Med. Base	Coated	830	M110/E	4000	3000	82	3000	10000
H070	70 Watt						M98/E	6000	4800	82	3000	10000
H100	100 Watt						M90/E	9000	7200	85	3000	12500
H150	150 Watt						M102	13300	10000	70	3900	15000
S050	50 Watt	ED17	Universal	Med. Base	Coated	N/A	S68	3800	3420	21	1900	24000+
S070	70 Watt						S62	5860	5270	21	1900	24000+
S100	100 Watt						S54	8800	7920	21	2100	24000+
S150	150 Watt						S55	15000	13500	21	2100	24000+
H070T6	70 Watt	T6	Universal	G12	Clear	830	M139/E	6600	5200	82	3000	12000
H150T6	150 Watt						M142/E	14000	10800	85	3000	12000
QL85	85 Watt	NA	Universal	NA	Coated	840	NA	6000	4800	80	4000	100000
QL165	165 Watt						NA	12000	9600	80	4000	100000

Note: Lamp data provided for reference only and is believed to be accurate at time of printing. Consult manufacturers' data for updated and accurate specifications, along with any specifications and precautions. Contact SELUX for specific manufacture if required. Other lamps are available, contact SELUX with any special requests. All lamps and ballasts supplied by SELUX are usually covered under the ballast and lamp manufacturers' warranties.

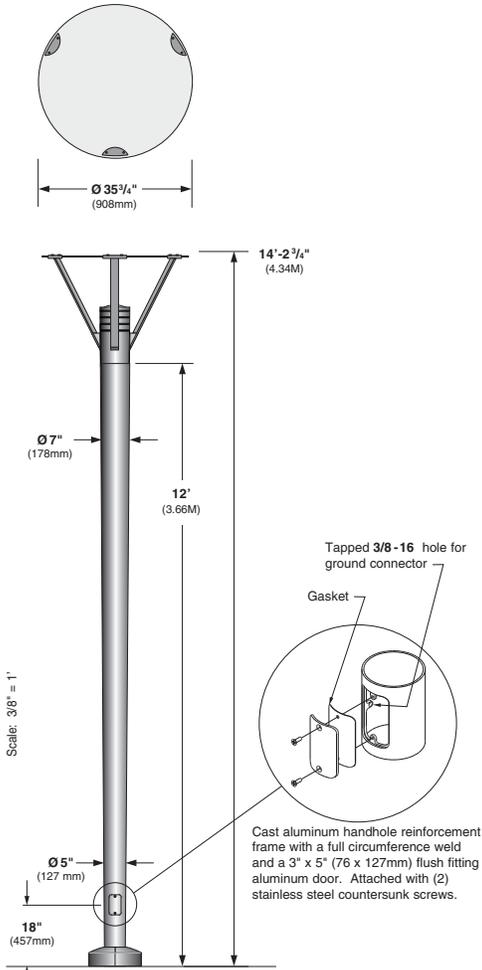
Type: L14

Ritorno® Round Symmetrical



Mounting Information

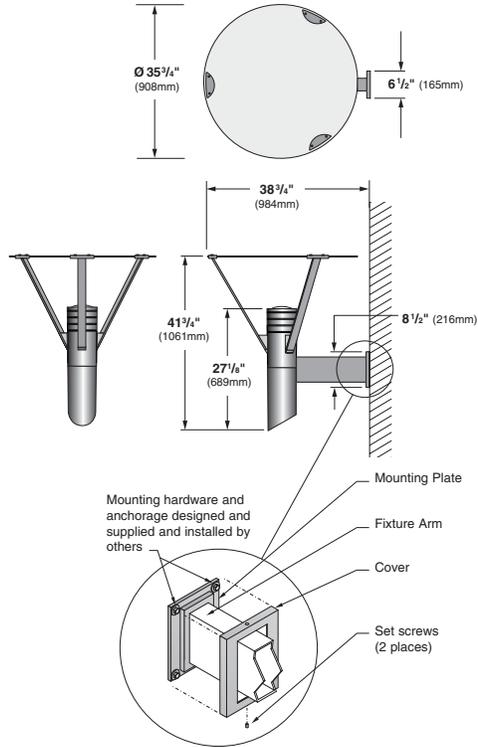
Single



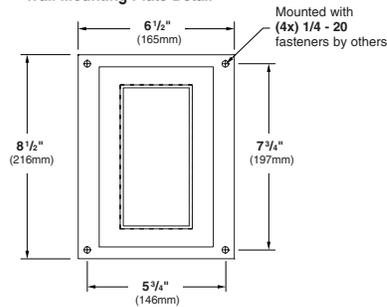
Effective Projected Area of Single Luminaire = 2 ft² (0.19m²)
 Weight of Luminaire = 60.0 lbs (27.3kg) Pole and luminaire engineered to withstand 120mph wind (+1.3 gust) as per AASHTO standards.

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 PO Box 1060, 5 Lumen Lane / Highland, NY 12528
 TEL: (845) 691-7723 / FAX: (845) 691-6749
 E-mail: seluxus@selux.com / Web Site: www.selux.com/usa
 RRS-0209-03

Wall Mount



Wall Mounting Plate Detail



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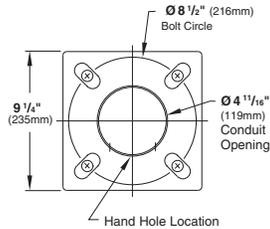
Type: L14

Ritorno® Round Symmetrical



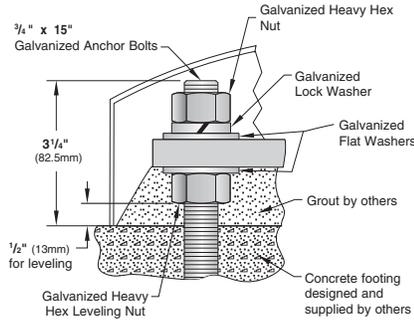
Bolt Circle

Use caution when setting anchor bolts. Bolts must be vertically straight and centered on dimensions shown.



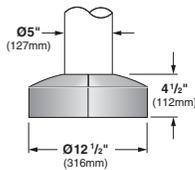
Note: Adequate drainage must be provided in concrete foundation or grout.

Anchor Bolt Detail

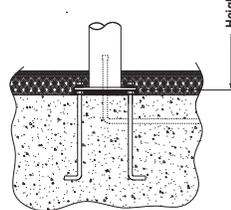


BC3 Standard Base Cover

Die-cast aluminum, two-piece field installable base cover.

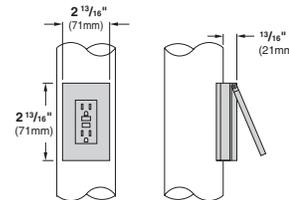


Alternate Mounting Detail



Options

GFCI Receptacle (REC) - GFCI duplex receptacle with cast base welded to pole and gasketed, provided with weather-proof, self-closing cover; located 36" (915mm) from base of pole, inline with handhole. Receptacle is intended only for portable tools or other portable equipment to be connected to outlet only when attended by operating personnel.



Ritorno Reverse Taper Pole (5" to 7")

EPA values calculated as per AASHTO LTS4 2001, to include fixture. Consult factory for heights other than 12'.

Pole Height	Windspeed					
	70	80	90	100	110	120
10'	16.70	12.34	9.31	7.19	5.62	4.42
12'	13.60	9.86	7.27	5.46	4.11	
14'	10.13	7.06	5.02			
16'	8.25	5.53				

All Poles are constructed per AASHTO standards for structural supports for highway signs, luminaires and traffic signals as published in 1975, amended and adopted in 1985 and 1994.

A consideration of field conditions such as (but not limited to) wind zone, height, vibration must be given by the designer/specifier for the appropriate application.

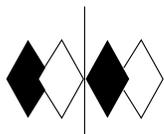
Performance of poles is dependent upon proper support/attachment of pole to adequate foundation design. SELUX does not design or offer recommendations for foundations. EPA values assume that the bottom of the pole is at grade level.

Call SELUX (1-800-SELUXCS) if there are any questions, or for any assistance in determining suitability with appropriate fixtures.

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 PO Box 1060, 5 Lumen Lane Highland, NY 12528
 TEL (845) 691-7723 FAX (845) 691-6749
 E-mail: seluxus@selux.com Web Page: www.selux.com/usa
 RRS-0209-04 (6-49096-00)

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Type: L15



itl boulder
THE LIGHT CENTER OF THE INDUSTRY SINCE 1955

INDEPENDENT TESTING LABORATORIES, INC.
 3386 LONGHORN ROAD, BOULDER, CO 80302 USA

PHONE: (303)442-1255 • FAX: (303)449-5274 • E-MAIL: itl@itlboulder.com • WEBSITE: www.itlboulder.com

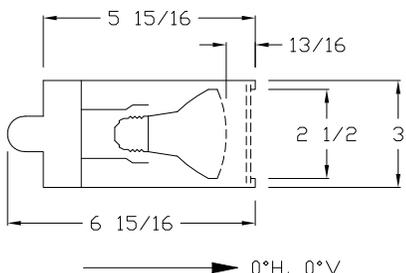
REPORT NUMBER: ITL46474 DATE: 06/04/97
 PREPARED FOR: B-K LIGHTING, INC.
 CATALOG NUMBER: MC-47-XXX-13-C
 LUMINAIRE: MACHINED BRASS SOCKET MOUNT, CYLINDRICAL METAL LAMP HOUSING WITH WHITE PAINTED GENERAL INTERIOR FINISH, CLEAR FLAT GLASS ENCLOSURE WITH CLEAR LINEAR PRISMATIC GLASS OVERLAY. PRISMS ORIENTED VERTICALLY.
 LAMP: ONE 50-WATT PAR 20 HALOGEN INCANDESCENT, PHILIPS 50PAR20/H/NSP, HORIZONTAL POSITION.
 REPORT IS BASED ON 550 LUMENS PER LAMP.

FLOODLIGHT CHARACTERISTICS

PAGE 1

IES TYPE	5H X 4V		
MAXIMUM CANDLEPOWER	812. AT	0.0 H,	0.5 V
HORIZONTAL BEAM ANGLE (50%)	53.3 deg		
VERTICAL BEAM ANGLE (50%)	16.4 deg		
HORIZONTAL FIELD ANGLE (10%)	84.9 deg		
VERTICAL FIELD ANGLE (10%)	49.2 deg		
BEAM LUMENS (EFFICIENCY)	111. (20.1 %)		
FIELD LUMENS (EFFICIENCY)	237. (43.0 %)		
TOTAL LUMENS (EFFICIENCY)	319. (57.9 %)		

AXIAL CANDLEPOWER	DEG	HORIZ.	DEG	VERT.
	76.0	5.	47.5	22.
	68.0	10.	42.5	25.
	60.0	13.	37.5	33.
	52.0	24.	32.5	50.
	44.0	63.	27.5	69.
	36.0	158.	22.5	96.
	28.0	359.	17.5	153.
	20.0	642.	12.5	259.
	12.0	718.	7.5	436.
	4.0	787.	2.5	745.
	0.0	808.	0.0	808.
	-4.0	787.	-2.5	729.
	-12.0	718.	-7.5	426.
	-20.0	642.	-12.5	225.
	-28.0	359.	-17.5	136.
	-36.0	158.	-22.5	89.
	-44.0	63.	-27.5	63.
	-52.0	24.	-32.5	40.
	-60.0	13.	-37.5	26.
	-68.0	10.	-42.5	22.
	-76.0	5.	-47.5	19.

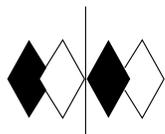


Checked*MY*.....
 Approved*R.P.BERGIN*.....

ALL CANDELA AND LUMEN VALUES IN THIS REPORT ARE BASED ON RELATIVE PHOTOMETRY WHICH ASSUMES A BALLAST FACTOR= 1.000. ANY CALCULATIONS PREPARED FROM THESE DATA SHOULD INCLUDE AN APPROPRIATE BALLAST FACTOR.

THIS REPORT IS BASED ON PUBLISHED INDUSTRY PROCEDURES. FIELD PERFORMANCE MAY DIFFER FROM LABORATORY PERFORMANCE.

Type: L15



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PHONE: (303)442-1255 • FAX: (303)449-5274 • E-MAIL: itl@itlboulder.com • WEBSITE: www.itlboulder.com

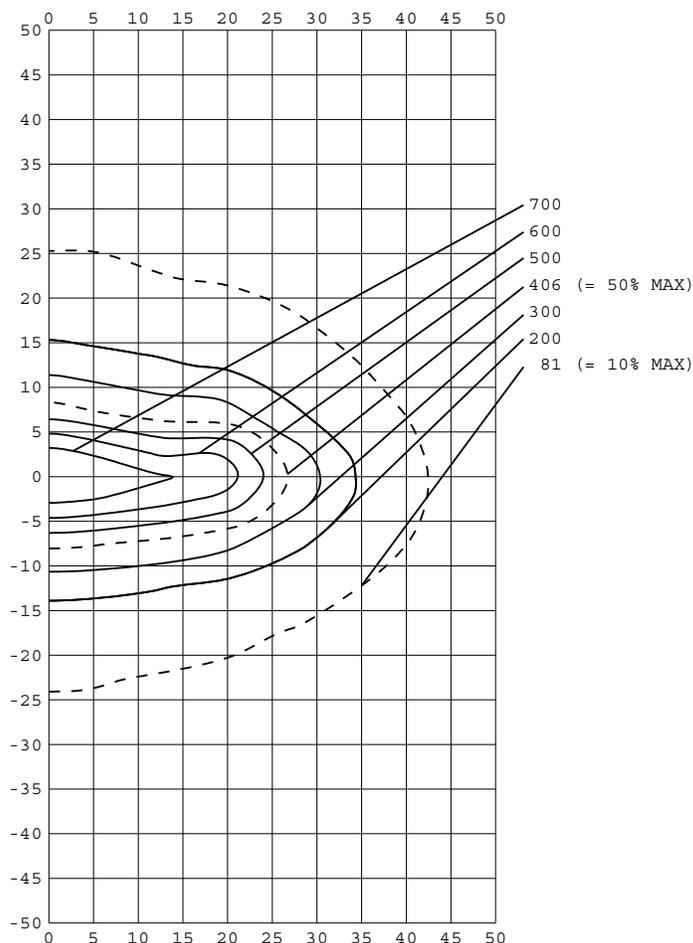
REPORT NUMBER: ITL46474
PREPARED FOR: B-K LIGHTING, INC.

DATE: 06/04/97

ISOCANDELA CURVES

PAGE 6

AVERAGE OF RIGHT AND LEFT SIDES



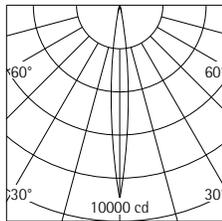
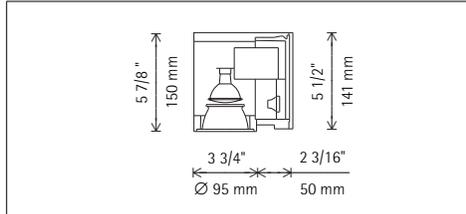
THIS REPORT IS BASED ON PUBLISHED INDUSTRY PROCEDURES. FIELD PERFORMANCE MAY DIFFER FROM LABORATORY PERFORMANCE.

Type: L16

ERCO

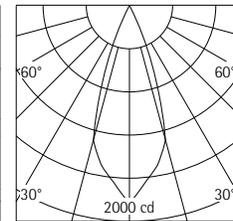
Cylinder Facade luminaire

direct lighting for low-voltage halogen lamps



MRC16 50W 12V GU5.3 10°

h(ft)	E(fc)	D
3	1000	0'6"
6	250	1'1"
9	111	1'7"
12	62	2'1"
15	40	2'7"



MRC16 50W 12V GU5.3 36°

h(ft)	E(fc)	D
3	204	1'11"
6	51	3'11"
9	23	5'10"
12	13	7'10"
15	8	9'9"

85022.023 Graphit m
MRC16 50W 12V GU5.3 10°
MRC16 50W 12V GU5.3 36°

Product description

Housing and wall plate: corrosion-resistant, cast aluminum, No-rinse surface treatment. Double powder-coated. Optimized surface for reduced accumulation of dirt. Housing removable for lamp replacement. Tamper-proof screw. 2 cable entries. Through-wiring possible. 3-pole terminal block. Magnetic transformer 120/12V, 60Hz.
Reflector: aluminum, silver, specular anodized. Softec lens. Lower safety glass.
Suitable for wet location (IP65): dust-proof and water jet-proof.
Weight 5.64lbs / 2.56kg

ERCO Lighting Inc.
160 Raritan Center Parkway
Suite 10
Edison, NJ 08837
USA
Tel.: +1 732 225 8856
Fax: +1 732 225 8857
info.us@erco.com

Technical Region: 120V/60Hz
Edition: 12.02.2008
Please download latest version from
www.erco.com/85022.023

Type: L17

LITE BOX, LITE CUBE

DAIFUKU DESIGNS



Lámparas-asientos en polietileno blanco. Aptos para exterior e interior. Aplicable para terrazas y jardines. Equipados con cable 9 m.

BOMBILLAS*

- LITE CUBE: 1x7 W máx. (E-27 bajo consumo).
- LITE BOX: 4x7 W máx. (E-27 bajo consumo).

*Colores: blanco (cálido 2700° K), rojo, verde, amarillo y azul.

ACABADOS

Polietileno blanco.

Lights-seats in white polyethylene designed for indoor and outdoor use, adapted for gardens and terraces. Equipped with 9 m of cable.

BULBS*

- LITE CUBE: 1x7 W max. (E-27 low energy).
- LITE BOX: 4x7 W max. (E-27 low energy).

*Colours: white (warm 2700° K), red, green, yellow and blue.

FINISHES

White polyethylene.

Sitzhocker und Bodenleuchte für den Innen- und Aussenraum. Kabellänge 9 Meter.

LAMPE*

- LITE CUBE: 1x7 W max. (Kompakleuchtstoff- lampe E-27).
- LITE BOX: 4x7 W max. (Kompakleuchtstofflampe E-27).

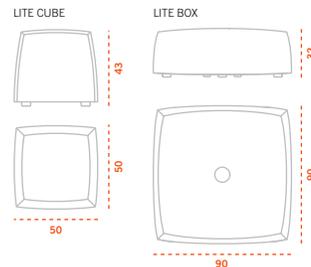
*Lichtfarbe: weiß (warm 2700° K), rot, grün, gelb oder blau nach Wahl.

OBERFLÄCHE

Polyethylen opalweiß.



Apto exteriores.
For outdoor use.
Für Außenanwendung.
LITE CUBE: IP 65.
LITE BOX: IP 66.



Type: L18



Plexineon White 1X Series

PRODUCT SUMMARY																						
	<p style="text-align: center; margin: 0;">PRODUCT FEATURES</p> <ul style="list-style-type: none"> Three Kelvin temperatures Energy efficient Long lifetime Stable and consistent color temperature Low voltage Easy to install Cool to the touch For use as exterior or interior accent, interior indirect, cove, stage and shelf lighting, signage and more 																					
<p>Color Temperatures (+/- 10%)</p> <ul style="list-style-type: none"> 3500°K 4500°K 6500°K <p>Diffuser Color</p> <ul style="list-style-type: none"> Light amber hue (when not illuminated) <p>Lengths Available</p> <ul style="list-style-type: none"> 2', 4', 6', 8' (610 mm, 1220 mm, 1830 mm, 2440 mm) 22" field cuttable pieces 9" x 9" illuminated outside corner pieces Factory custom lengths available to the nearest 1" Factory convex or concave bends to minimum inside radius of 5" Factory "easy bends" to 3/16" radius¹ Gentle field bends to a 48" radius 	<p>Power Supply</p> <ul style="list-style-type: none"> Class 2 24VDC, 100 Watts - must be supplied by iLight Primary voltage: 120 or 120-277 depending on model Secondary voltage: 24VDC 4.1 A Max Maximum illumination length of a single LED power supply: 32 feet or 9.8 meters <p>Power Supply Tips</p> <ul style="list-style-type: none"> 20% maximum overage for breaker for primary current draw Do not plug multiple power supplies into one run of Plexineon All iLight power supplies should be on an independent circuit Recommend surge protection upstream from power supply Verify correct voltage prior to wiring to non-switching power supplies <p>Low Voltage Cable</p> <p>Maximum distance of low voltage cable in any given run:</p> <ul style="list-style-type: none"> 14 AWG: 40 feet or 12.19 meters 12 AWG: 60 feet or 18.29 meters 10 AWG: 100 feet or 30.48 meters 																					
<p>I. Drawings required for production For the most current technical information, please refer to www.ilight-tech.com.</p>																						
ORDERING INFORMATION																						
<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; border: 1px solid black; padding: 2px;">CLASS</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">VOLTAGE</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">COLOR</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">HOUSING</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">LENGTH</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">CHANNEL</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">VERSION</td> </tr> <tr> <td style="text-align: center; border: 1px solid black; padding: 2px;">T</td> <td style="text-align: center; border: 1px solid black; padding: 2px;">24</td> <td style="text-align: center; border: 1px solid black; padding: 2px;"></td> <td style="text-align: center; border: 1px solid black; padding: 2px;">S</td> <td style="text-align: center; border: 1px solid black; padding: 2px;"></td> <td style="text-align: center; border: 1px solid black; padding: 2px;"></td> <td style="text-align: center; border: 1px solid black; padding: 2px;">00</td> </tr> <tr> <td style="text-align: center; font-size: small;">T = Trim</td> <td style="text-align: center; font-size: small;">24 = 24V</td> <td style="text-align: center; font-size: small;">W35 = 3500°K W45 = 4500°K W65 = 6500°K</td> <td style="text-align: center; font-size: small;">S = Silver</td> <td style="text-align: center; font-size: small;">2F = 2 Feet 4F = 4 Feet 6F = 6 Feet 8F = 8 Feet CL = Custom Length TT = 22" Cuttable 9M = Outside Corner BE= Bend - Easy BN = Bend - Convex BV= Bend - Concave</td> <td style="text-align: center; font-size: small;">SC = Stainless Steel Channel NC = No Channel</td> <td style="text-align: center; font-size: small;">00</td> </tr> </table>	CLASS	VOLTAGE	COLOR	HOUSING	LENGTH	CHANNEL	VERSION	T	24		S			00	T = Trim	24 = 24V	W35 = 3500°K W45 = 4500°K W65 = 6500°K	S = Silver	2F = 2 Feet 4F = 4 Feet 6F = 6 Feet 8F = 8 Feet CL = Custom Length TT = 22" Cuttable 9M = Outside Corner BE= Bend - Easy BN = Bend - Convex BV= Bend - Concave	SC = Stainless Steel Channel NC = No Channel	00	<p>PNW1V2-0108</p>
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Type: L18



Plexineon White 1X Series

TECHNICAL INFORMATION	
MECHANICAL WITHOUT EXTRUSION	<p>Width & Height Housing</p> <ul style="list-style-type: none"> 0.55" (14mm) w x 1.35" (34mm) h (with c-channel) UV and impact resistant acrylic diffuser UV resistant plastic channel Stainless steel c-channel for mechanical support <p>Mounting</p> <ul style="list-style-type: none"> Stainless steel spring mounted clips Clips to be 2" in from end of piece and no more than 2' maximum between clips <p>Minimum Piece Spacing</p> <ul style="list-style-type: none"> Linear (end to end) = 3/8" Parallel (edge to edge) = 1" <p><small>*The minimum space for ventilation surrounding the Plexineon product is 1.0". This distance should be maintained on the three sides, left and right of the product as well as in front of product. Other configurations subject to specific application testing.</small></p> <p>Power Supply Weight</p> <ul style="list-style-type: none"> Electronic (Advance) Power Supply is 2 lbs. Outdoor Magnetic Hybrid Power Supply is 9 lbs. <p>Power Supply Dimensions</p> <ul style="list-style-type: none"> Electronic (Advance) = 9 1/2" x 1 1/4" x 1 3/4" Outdoor Magnetic Hybrid = 8 3/8" x 3 1/2" x 4 1/4"
ELECTRICAL	<p>Load Voltage 24V DC</p> <p>Load Current 108 mA/foot at 24VDC</p> <p>Maximum Run Length 32 feet with an iLight approved power supply</p> <p>DC Cable</p> <ul style="list-style-type: none"> 14 AWG, PVC/Nylon Type TC 600 Volt power and control cable or equivalent FT-4 fire rating Class 2 wiring system Connectors: Molex Splashproof - JIS D0203 S2 <p>Electrical Tips</p> <ul style="list-style-type: none"> Only use iLight approved transformers Do not cut non-cuttable pieces
ENVIRONMENTAL	<p>Operating Temperature Range -25°C to 50°C (-13°F to 122°F)</p> <p>Storage Temperature Range -25°C to 75°C (-13°F to 167°F)</p> <p>Certification</p> <ul style="list-style-type: none"> Plexineon is MetLabs listed. Metlabs is a Nationally Recognized Testing Laboratory (NTRL). Complies with UL 1598 and CSA c22.2 No. 250 in Luminaire, Wet listed. Power Supplies are RU listed. RU stands for Recognized Components by Underwriters Laboratory.

Type: L19

eW Cove Powercore

An EssentialWhite™ Product



eW® Cove Powercore is a dimmable, line-voltage, linear light fixture for common medium-luminance alcove applications. Its low profile makes it a perfect choice for many retail, exhibit, hospitality, and architectural interior settings.

Runs of up to 100 linear feet on a single circuit are possible as well as very smooth dimming. An integrated mounting bracket, end-to-end connections, and an optional mounting track ensure a simple, fast installation.

- Integral mounting bracket with 180° rotation
- Low power consumption (<6 W start-up; 4.5 W steady-state)
- End-to-end connections
- Color temperatures of 2800 K and 4200 K
- Sizes of 12 in (305 mm) and 6 in (152 mm)
- Up to 100 12 Inch or 150 6 Inch fixtures may be used in a series
- Powercore® technology supports 100, 120, and 230 VAC line voltage for simple installations and long runs
- DIMand™ technology provides smooth dimming capability with ELV-type dimmers
- Optibin® technology ensures uniform light quality

OPTIBIN®
CKTECHNOLOGY

POWERCORE®
CKTECHNOLOGY

DIMAND™
CKTECHNOLOGY



PHILIPS

Type: L19

eW Cove Powercore Specifications

3

eW Cove Powercore Specifications

Specifications are subject to change without notice.

	6-Inch Fixture	12-Inch Fixture
Length	6 in (152 mm)	12 in (305 mm)
Width	1.25 in (32 mm) (tube diameter)	
Height	1.37 in (35 mm)	
Weight	3 oz. (85 g)	5 oz. (142 g)
Source	High-efficacy (>40 LPW), high-brightness LEDs that enable eW Cove Powercore installations to meet California Title 24 requirements.	
Color Temperature	2800 K (+375/-300) or 4200 K (+400/-500)	
LEDs Per Fixture	3	5
CRI	71: 2800 K 79: 4200 K	71: 2800 K 77: 4200 K
Total Output (Lumens)	64: 2800 K 72: 4200 K	135: 2800 K 177: 4200 K
Efficacy (Lm/W)	30.7: 2800 K 39.3: 4200 K	30.7: 2800 K 39.3: 4200 K
Beam Angle	110° x 110°	
Mixing Distance	2 in (51 mm) to uniform light	
Housing	Charcoal gray, UL-recognized, injection-molded plastic.	
Lens	Clear polycarbonate	
Environment	UL Dry; CE IP20	
Inter-fixture Connectors	IEC 15 A (max) with C13 plug	
Maximum Run Length	150 fixtures	100 fixtures
Leader Cable	2-pole, 2-wire, 15 A (sold separately)	
Listings	UL/CUL (120 VAC), CE	
Control	Line switches or ELV (electronic low voltage) commercially-available dimmers.	
Line Voltage	100, 120, or 230 VAC	
Power Consumption	4 W max. at start-up 2.2 W max. steady state	6 W max. at start-up 4.5 W max. steady state
Temperature Range	-4°F – 122°F (-20°C – 50°C) operating temperature	
Humidity Range	0 – 95% non-condensing	
LED Source Life	50,000 hours, based on LED manufacturers' test data	

Philips Solid-State Lighting Solutions, Inc. • 3 Burlington Woods Drive • Burlington, MA 01803 • USA
Tel: 617.423.9999 • Toll Free: 888.385.5742 • Fax: 617.423.9998 • www.colorkinetics.com

Type: L19

6

eW Cove Powercore Data Sheet

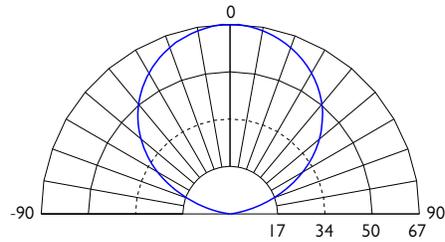
eW Cove Powercore 12-Inch 4200 K Photometrics

Photometric data in each illustration is based on independent testing lab results. IES data is available at <http://www.colorkinetics.com/support/ies>. The tested fixture had these specifications:

Voltage	120 VAC
Optics	None
Lens	Optically clear polycarbonate
Source	5 LEDs
Beam Angle	110° x 110°
Distribution	Symmetric direct illumination

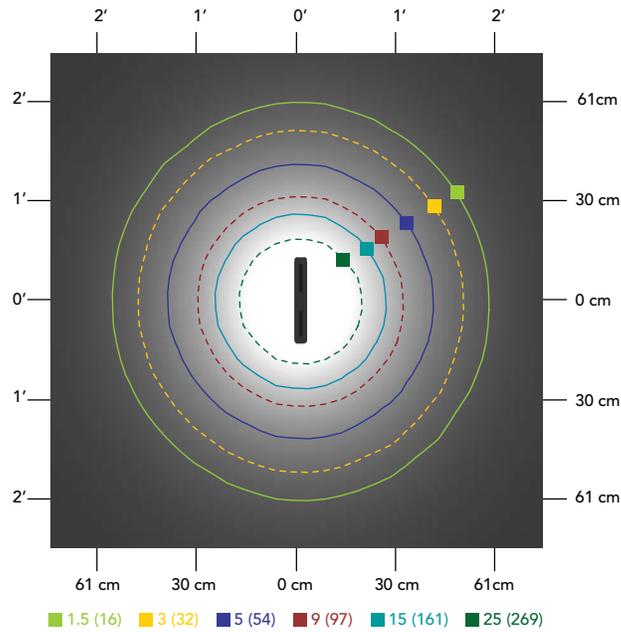
Candle Power Distribution

The dashed line indicates that 34 candela is 50% of peak.



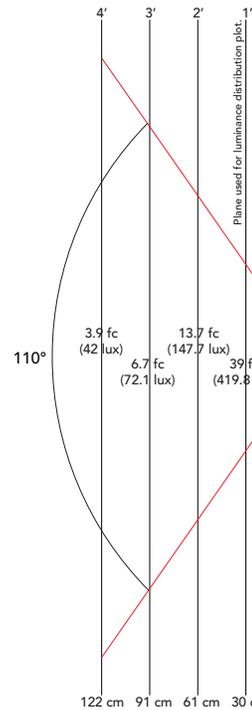
Illuminance Distribution

This illustration shows the plane 1 ft (305 mm) from the fixture. Data is in footcandles and (lux).



Illuminance Beam Angle

This illustration shows measurement of the center beam and the fixture's angle. Data is in footcandles and (lux).



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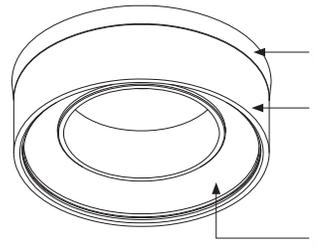
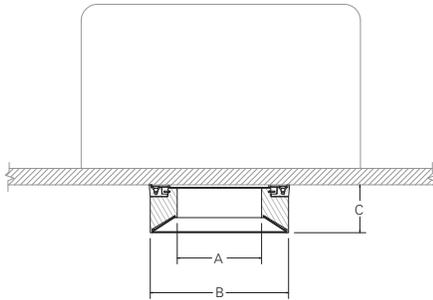
Type: L21

LIGHTOLIER®

Architectural Decorative Vetro Downlight

Page 1 of 2

Evolution, I



Complete Fixture consists of Decorative Element/Trim-Kit + Frame-In Kit. Each sold separately.
2 Piece Ordering System, Example: D3MR01 + C3LV

Decorative Element/Trim Kit Catalog No.	Frame-In Kit	Lamping	Dimensions	
			A	B
3" Evolution D3MR01	C3LV; C3AICLV; C3ALV; C3LVE1; C3LVE2; C3ALVE1; C3AICLVE1	50W MR16	2 5/8"	4 1/4"
4" Evolution D4MR01	C4LV; C4ALV; C4AICLV	50W MR16	3 1/2"	5 5/8"

Features

- Decorative Element:** Solid high temp, UV resistant composite with open aperture. Interior diameter is frosted. Polished exterior.
- Aluminum Insert:** Satin Aluminum ring is mechanically inserted in composite to create drama and intrigue in the element.
- Die Cast Ring:** Exterior edge of construction ring is visible, satin aluminum finish matches diameter of decorative element for a flangeless appearance.
- Integral Reflector:** 16 ga. aluminum, 50° visual cutoff to lamp and lamp image. Decorative Element is mechanically attached to reflector via die cast ring. Reflector is specular clear for best performance and aesthetics.
- Cover Glass:** 3" Evolution contains high temperature soft focus lens. 4" Evolution contains high temperature perimeter frost.
- Trim Kit:** For 3" and 4" Evolution, trim kit, reflector and decorative element ship complete.
- Frame-In Kit:** Specified separately. See Frame-In Kit Specification Sheet for details.

Mechanical

Decorative element is mechanically secured to the die cast construction and the integral reflector from the factory.

Labels

cULus (Damp Location)

Job Information	Type:
Job Name:	
Cat. No.:	
Lamp(s):	
Notes:	

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Type: L21

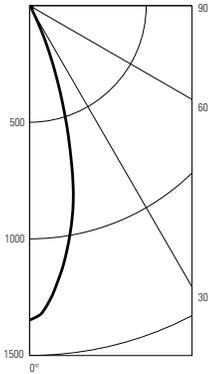
LIGHTOLIER®

Architectural Decorative Vetro Downlight

Page 2 of 2

Evolution, I

D3MR01-NFL



Calculate 3" Dia. Vetro Downlight, Cat # C3MRDCLW/D3MR01
50W G.E. MR16 NFL (25 deg.) Lamp.
Lumen Rating = 800 LMS. Lighttech XFMR LET-75

Candlepower Summary

Angle	Mean CP	Lumens
0	1348	
5	1225	114
10	997	
15	694	195
20	364	
25	129	75
30	27	
35	19	13
40	17	
45	16	13
50	15	
55	14	13
60	13	
65	12	12
70	10	
75	10	10
80	9	
85	9	10
90	9	

Tested According to IES Procedures. Test Distance Exceeds Five Times the Greatest Luminous Opening of Luminaire.

Coefficients of Utilization

Ceiling	80%			70%			50%			30%			10%					
	W	L	0	W	L	0	W	L	0	W	L	0	W	L	0			
Wall	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR	Zonal Cavity Method - Effective Floor Reflectance = 20%																	
Room Cavity Ratio	0	68	68	68	66	66	66	66	63	63	63	60	60	60	58	58	58	57
	1	65	63	62	61	63	62	61	60	60	59	58	58	57	56	56	55	54
	2	62	60	58	56	61	59	57	56	57	56	54	56	54	53	54	53	51
	3	60	57	55	53	59	56	54	53	55	53	52	54	52	51	53	52	50
	4	58	55	53	51	58	55	52	50	53	51	50	52	51	49	51	50	49
	5	57	53	50	49	56	53	50	48	52	50	48	51	49	48	50	49	47
	6	55	51	49	47	54	51	49	47	50	48	47	50	48	46	49	47	46
	7	53	50	47	46	53	49	47	45	49	47	45	48	46	45	48	46	44
	8	52	48	46	44	52	48	46	44	47	45	44	47	45	44	47	45	44
	9	51	47	45	43	50	47	45	43	46	44	43	46	44	43	46	44	43
	10	50	46	44	42	49	46	44	42	45	43	42	45	43	42	45	43	42

Determined in Accordance With Current IES Published Procedures
Luminaire Input Watts = 52.0

Zonal Lumens and Percentages

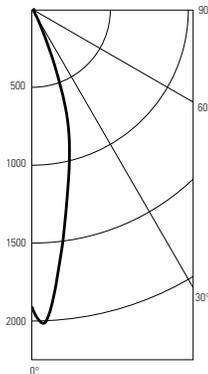
Zone	Lumens	% Lamp	% Luminaire
0-30	384	48.02	94.55
0-40	397	49.63	87.98
0-60	422	52.78	92.92
0-90	454	56.80	100.00
40-90	57	7.17	12.62
60-90	32	4.02	7.08
90-180	0	.00	.00
0-180	454	56.80	100.00

Prepared For:
Lightolier
Fall River, MA

Certified test report no. 3562FR
Computed by LSI program **TEST-LIT
SC = 0.5

** Efficiency = 56.8% **

D4MR01-NFL



Calculate 4" dia. Vetro Recessed Downlight D4MR01
50W g.E. MR16 NFL (25 deg.) Lamp. Lumen Rating = 800 Lms.
Lighttech XFMR LET-75

Candlepower Summary

Angle	Mean CP	Lumens
0	1914	
5	1761	160
10	1265	
15	918	258
20	533	
25	170	108
30	56	
35	19	17
40	17	
45	16	12
50	15	
55	13	12
60	13	
65	12	12
70	11	
75	10	11
80	10	
85	10	11
90	9	

Tested According to IES Procedures. Test Distance Exceeds Five Times the Greatest Luminous Opening of Luminaire.

Coefficients of Utilization

Ceiling	80%			70%			50%			30%			10%					
	W	L	0	W	L	0	W	L	0	W	L	0	W	L	0			
Wall	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR	Zonal Cavity Method - Effective Floor Reflectance = 20%																	
Room Cavity Ratio	0	89	89	89	87	87	87	87	83	83	83	80	80	80	77	77	77	75
	1	86	84	82	81	84	83	81	80	79	78	77	77	75	74	73	73	72
	2	83	80	78	75	81	79	75	75	76	74	73	74	73	71	72	71	70
	3	80	76	74	71	79	75	73	71	74	72	70	72	70	69	71	69	68
	4	78	74	71	69	77	73	70	68	72	69	67	70	68	67	69	67	65
	5	76	71	68	66	75	71	68	66	69	67	65	68	66	64	67	65	64
	6	74	69	66	64	73	69	66	64	68	65	63	67	65	63	66	64	62
	7	72	67	64	62	71	67	64	62	66	63	62	65	63	61	64	62	61
	8	70	65	62	60	69	65	62	60	64	62	60	64	61	60	63	61	59
	9	68	64	61	59	68	63	61	59	63	60	58	62	60	58	62	60	58
	10	67	62	59	57	66	62	59	57	61	59	57	61	59	57	61	58	57

Determined in Accordance With Current IES Published Procedures
Luminaire Input Watts = 52.0

Zonal Lumens and Percentages

Zone	Lumens	% Lamp	% Luminaire
0-30	525	65.64	87.50
0-40	542	67.81	90.38
0-60	566	70.87	94.46
0-90	600	75.02	100.00
40-90	57	7.22	9.62
60-90	33	4.16	5.54
90-180	0	.00	.00
0-180	600	75.02	100.00

Prepared For:
Lightolier
Fall River, MA

Certified test report no. 3598FR
Computed by LSI program **TEST-LIT
SC = 0.5

** Efficiency = 75.0% **

Job Information **Type:**

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Type: L22



line™ 1.5

Application

io Lighting's **line series 1.5** is approximately 1.5" in diameter. UL listed for wet locations, this LED-based linear floodlight produces functional luminous intensities for lighting bridges and building facades. Ideal for grazing and accent illumination, individual units may be placed end to end to create continuous rows without obvious shadows between fixtures. LEDs are similar to halogen light sources in that they are point sources that can reveal superior definition to textural surfaces and sparkle to reflective surfaces.

series 1.5 is a low voltage linear luminaire that may be ordered in incremental nominal lengths that include: 18" and 36". Optional beam spreads along the perpendicular axis of the fixture include 10°, 45° and 65°. io ensures that each LED is driven with the proper current and voltage, which enables the average rated life to be 50,000 hours at 70% of lamp lumen output. To ensure proper performance, interior architectural details should allow for ventilation and air flow around the fixture. Ambient temperature surrounding the fixture shall not exceed 120°F (48.9°C).

Light Output

line series 1.5 is available with two lumen outputs for white light only. Red, green and blue are available in high output only. IES format files may be obtained from the factory or downloaded from www.iolighting.com.

Standard Output:
 3000K White: 34 lms/ft
 5000K White: 40 lms/ft

High Output:
 3000K White: 170 lms/ft
 5000K White: 230 lms/ft

Refer to light output tables for footcandle values at various distances. IES files will be available third quarter '07.

Construction

The light weight, yet durable extruded aluminum housing provides recommended heat sink requirements for LEDs. Patented precision optic assembly is composed of a customized acrylic material that offers very high transmissivity, UV stability and excellent longevity. **series 1.5** is UL listed for wet locations.

Electrical

8'-0" 18 AWG, 600 volt TFFN rated power cords are supplied with plug connector. Injection molded end cap is designed to receive both the plug electrical connector and an interconnect for daisy chain. 24 volt 100 watt power supply will be provided as a standard. See daisy chain and remote distance requirements in chart on the lower left corner of this specification sheet.

Power supply and dimming module must be specified separately. For detailed information, consult io website or io representative for specification sheets.

Power Consumption

Standard Output : 2.1 w/ft

High Output: 7.6 w/ft

Power consumption does not include power supply losses. Consult io driver specification sheets (at www.iolighting.com) for losses associated with each driver option.

Finish

Anodized aluminum finish is standard. Custom finishes may be available upon request.

Dimensions

Beam Spreads

10° 45° 65°

Lengths

18.25" (0.46m) 18"
 35.25" (0.90m) 36"

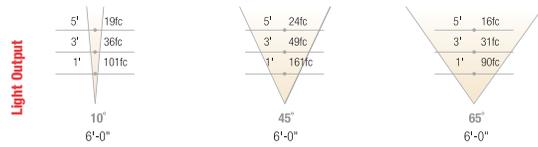
Standard Output		
TYPE	SUPPLIES	REMOTE DISTANCE
24v100w	combined fixture	18'-0" (5.5m) w/18AWG
	run lengths up to	48'-0" (14m) w/14AWG
	42'-0" (12.8m).	71'-0" (21.6m) w/12AWG
	Single run lengths	
	NTE 10.5' (3.2m)	
	or (7) 18" fixtures.	

High Output		
TYPE	SUPPLIES	REMOTE DISTANCE
24v100w	up to 12'-0" (3.6m)	18'-0" (5.5m) w/18AWG
	Single run lengths	46'-0" (14m) w/14AWG
	NTE 7.5' (2.3m) or	71'-0" (21.6m) w/12AWG
	(5) 18" fixtures	

Power Supply (100 w driver)

1 io Lighting 370 Corporate Woods Parkway Vernon Hills, IL 60061-3107 T 847.735.7000 F 847.735.7001 E info@iolighting.com W iolighting.com cULUS

Type: L22



LIGHT OUTPUT CONVERSION TABLE

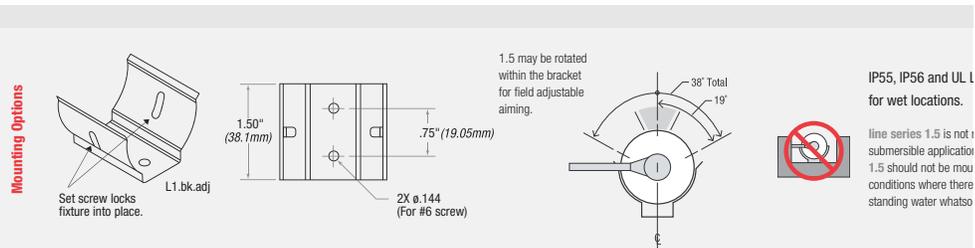
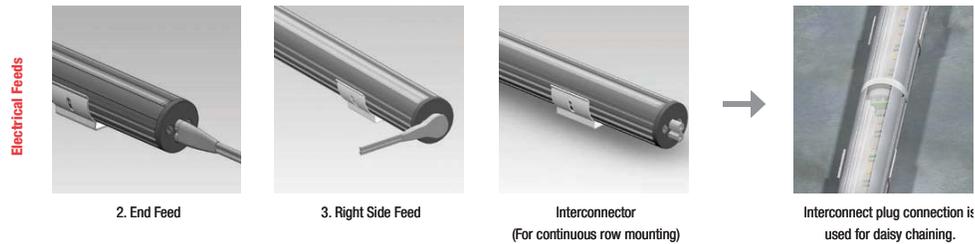
White Light Output	3000K S.O.	5000K S.O.	3000K H.O.	5000K H.O.
Light Output Multiplier	0.20 ⁽¹⁾	0.24 ⁽¹⁾	1.0 ⁽¹⁾	1.3 ⁽¹⁾

Color Light Output	RED	GREEN	BLUE
Light Output Multiplier	0.47	0.71	0.24

NOTE: Footcandle values based on Warm White H.O.

For Metric Conversion	1"	3"	5"	6"
	0.3m	0.9m	1.5m	1.8m

IES format photometrics may be downloaded from www.ioighting.com



Order Code

0	10	E								
io	1	2	3	4	5	6	7	8	9	10
1. LIGHT OUTPUT			4. DISTRIBUTION			7. LENGTH			9. VOLTAGE / DIMMING	
10 1.5 S.O. or H.O.			10 10 Degree 45 45 Degree 65 65 Degree			UNITS (ACTUAL) 18 18" (18.25") 36 36" (35.25") IP56 Lens face up or down ³ IP55 Lens face down ³			1 120v 2 277v 3 120v w/dim 4 277v w/dim 5 Other	
2. LOCATION			5. MOUNTING			FOR CONTINUOUS ROW			10. SPECIFY DRIVER / DIMMING	
E Exterior			100 Surface Note: Universal mounting bracket may be used for all mounting orientations. Set screw locks in aim angle.			Specify length (e.g., 96'-0") Note: Overall length must be divisible by 18"			Note: If left blank, io will supply 100 watt drivers. Download Power Supply specification sheet from www.ioighting.com	
3. COLOR			6. FINISH			8. ELECTRICAL FEED				
3K White 3000K(Standard) ⁽¹⁾ 3KH White 3000K (High Output) ⁽¹⁾ 5K White 5000K(Standard) ⁽¹⁾ 5KH White 5000K (High Output) ⁽¹⁾ R Red ⁽²⁾ G Green ⁽²⁾ B Blue ⁽²⁾			1 Anodized Aluminum 2 Anodized Custom Color			2 End Feed 3 Right Side Feed Note: For straight continuous rows fed by one driver, interconnects will be supplied as required				

Footnotes

- White light variance between LEDs within a single fixture will not exceed +/- 200k.
- Refer to conversion table for output. High Output only (7.6 w/l).
- 18" lengths may be installed in face up or face down applications. 36" lengths may be installed in face down applications only.

For Metric Conversion	1"	1"	1"
	25.4mm	2.54cm	0.3m

Lamps: 28W T5

T5 Mini Bipin

PENTRON® T5 LAMPS

PENTRON® High Performance T5 Lamps

Nominal Wattage	Bulb	Nominal Length (in)	MOL (in)	Base	Product Number	Ordering Abbreviation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens Initial @25°C/77°F	Approx Lumens Mean @35°C/95°F	Symbols & Footnotes
21	T5	36	34	Mini Bipin	20924	FP21/841/ECO	40	20000	4100	82	1890 2100	1767 1953	☑ 1,2,6,8,9,11
					20838	FP28/60[RED]	40	10000		2100		1,2,8,9,11	
28	T5	48	45.8	Mini Bipin	20839	FP28/66[GREEN]	40	10000			3500		1,2,8,9,11
					20840	FP28/67[BLUE]	40	10000		700		1,2,8,9,11	
					20836	FP28/830	40	20000	3000	82	2600 2900	2418 2697	☑ 1,2,8,9,11
					20868	FP28/830/ECO	40	20000	3000	82	2600 2900	2418 2697	☑ 1,2,6,8,9,11
					20841	FP28/835	40	20000	3500	82	2600 2900	2418 2697	☑ 1,2,8,9,11
					20901	FP28/835/ECO	40	20000	3500	82	2600 2900	2418 2697	☑ 1,2,6,8,9,11
					20842	FP28/841	40	20000	4100	82	2600 2900	2418 2697	☑ 1,2,8,9,11
35	T5	60	57.6	Mini Bipin	20902	FP28/841/ECO	40	20000	4100	82	2600 2900	2418 2697	☑ 1,2,6,8,9,11
					20843	FP35/830	40	20000	3000	82	3300 3650	3069 3394	☑ 1,2,8,9,11
					20925	FP35/830/ECO	40	20000	3000	82	3300 3650	3069 3394	☑ 1,2,6,8,9,11
					20844	FP35/835	40	20000	3500	82	3300 3650	3069 3394	☑ 1,2,8,9,11
					20926	FP35/835/ECO	40	20000	3500	82	3300 3650	3069 3394	☑ 1,2,6,8,9,11
					20845	FP35/841	40	20000	4100	82	3300 3650	3069 3394	☑ 1,2,8,9,11
					20927	FP35/841/ECO	40	20000	4100	82	3300 3650	3069 3394	☑ 1,2,6,8,9,11

PENTRON® High Output, High Performance T5 Lamps

Nominal Wattage	Bulb	Nominal Length (in)	MOL (in)	Base	Product Number	Ordering Abbreviation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens Initial @25°C/77°F	Approx Lumens Mean @35°C/95°F	Symbols & Footnotes
24	T5	24	22.2	Mini Bipin	20846	FP24/830/HO	40	20000	3000	82	1750 2000	1627 1860	☑ 1,2,8,9,11
					20928	FP24/830/HO/ECO	40	20000	3000	82	1750 2000	1627 1860	☑ 1,2,6,8,9,11
					20852	FP24/835/HO	40	20000	3500	82	1750 2000	1627 1860	☑ 1,2,8,9,11
					20929	FP24/835/HO/ECO	40	20000	3500	82	1760 2000	1627 1860	☑ 1,2,6,8,9,11
					20853	FP24/841/HO	40	20000	4100	82	1750 2000	1627 1860	☑ 1,2,8,9,11
					20931	FP24/841/HO/ECO	40	20000	4100	82	1760 2000	1627 1860	☑ 1,2,6,8,9,11
39	T5	36	34	Mini Bipin	20854	FP39/830/HO	40	20000	3000	82	3100 3500	2883 3255	☑ 1,2,8,9,11

For more complete product information visit www.sylvania.com

Symbols/Footnotes on page 139-1

Lamps: 24W T5

T5 Mini Bipin

PENTRON® T5 LAMPS

PENTRON® High Performance T5 Lamps

Nominal Wattage	Bulb	Nominal Length (in)	MOL (in)	Base	Product Number	Ordering Abbreviation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens Initial @25°C/77°F	Approx Lumens Mean @35°C/95°F	Symbols & Footnotes
21	T5	36	34	Mini Bipin	20924	FP21/841/ECO	40	20000	4100	82	1890	1767	☀️ 1,2,6, 8,9,11
					2100	1953							
28	T5	48	45.8	Mini Bipin	20838	FP28/60[RED]	40	10000			2100		☀️ 1,2,8,9,11
					20839	FP28/66[GREEN]	40	10000		3500		☀️ 1,2,8,9,11	
					20840	FP28/67[BLUE]	40	10000		700		☀️ 1,2,8,9,11	
					20836	FP28/830	40	20000	3000	82	2600	2418	☀️ 1,2,8,9,11
					20868	FP28/830/ECO	40	20000	3000	82	2600	2418	☀️ 1,2,6, 8,9,11
					20841	FP28/835	40	20000	3500	82	2600	2418	☀️ 1,2,8,9,11
					20901	FP28/835/ECO	40	20000	3500	82	2600	2418	☀️ 1,2,6, 8,9,11
					20842	FP28/841	40	20000	4100	82	2600	2418	☀️ 1,2,8,9,11
					20902	FP28/841/ECO	40	20000	4100	82	2600	2418	☀️ 1,2,6, 8,9,11
35	T5	60	57.6	Mini Bipin	20843	FP35/830	40	20000	3000	82	3300	3069	☀️ 1,2,8,9,11
					20925	FP35/830/ECO	40	20000	3000	82	3300	3069	☀️ 1,2,6, 8,9,11
					20844	FP35/835	40	20000	3500	82	3300	3069	☀️ 1,2,8,9,11
					20926	FP35/835/ECO	40	20000	3500	82	3300	3069	☀️ 1,2,6, 8,9,11
					20845	FP35/841	40	20000	4100	82	3300	3069	☀️ 1,2,8,9,11
					20927	FP35/841/ECO	40	20000	4100	82	3300	3069	☀️ 1,2,6, 8,9,11
					3650	3394							

PENTRON® High Output, High Performance T5 Lamps

Nominal Wattage	Bulb	Nominal Length (in)	MOL (in)	Base	Product Number	Ordering Abbreviation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens Initial @25°C/77°F	Approx Lumens Mean @35°C/95°F	Symbols & Footnotes
24	T5	24	22.2	Mini Bipin	20846	FP24/830/HO	40	20000	3000	82	1750	1627	☀️ 1,2,8,9,11
					20928	FP24/830/HO/ECO	40	20000	3000	82	1750	1627	☀️ 1,2,6, 8,9,11
					20852	FP24/835/HO	40	20000	3500	82	1750	1627	☀️ 1,2,8,9,11
					20929	FP24/835/HO/ECO	40	20000	3500	82	1760	1627	☀️ 1,2,6, 8,9,11
					20853	FP24/841/HO	40	20000	4100	82	1750	1627	☀️ 1,2,8,9,11
					20931	FP24/841/HO/ECO	40	20000	4100	82	1760	1627	☀️ 1,2,6, 8,9,11
2000	1860												
39	T5	36	34	Mini Bipin	20854	FP39/830/HO	40	20000	3000	82	3100	2883	☀️ 1,2,8,9,11
											3500	3255	

For more complete product information visit www.sylvania.com

Symbols/Footnotes on page 139-1

Lamps: 13W CFL



DULUX® S/E 4-PIN COMPACT FLUORESCENT LAMPS

for Dimming and Electronic Ballast

Nominal Wattage	Bulb	MOL			Product Number	Ordering Abbreviation	NEMA Generic Designation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens		Symbols & Footnotes
		(in)	(mm)	Base								Initial @25°C/77°F	Mean	
5	T4	3.4	85	2G7	20311	CF5DS/E/827	CFT5W/2G7/827	50	10000	2700	82	230	198	☐ 1,2,3,8,9
					20315	CF5DS/E/841	CFT5W/2G7/841	50	10000	4100	82	230	198	☐ 1,2,3,8,9
7	T4	4.5	115	2G7	20312	CF7DS/E/827	CFT7W/2G7/827	50	10000	2700	82	400	344	☐ 1,2,3,8,9
					20316	CF7DS/E/841	CFT7W/2G7/841	50	10000	4100	82	400	344	☐ 1,2,3,8,9
9	T4	5.7	145	2G7	20313	CF9DS/E/827	CFT9W/2G7/827	50	10000	2700	82	580	499	☐ 1,2,3,8,9
					20317	CF9DS/E/841	CFT9W/2G7/841	50	10000	4100	82	580	499	☐ 1,2,3,8,9
13	T4	6.2	157	2GX7	20314	CF13DS/E/827	CFT13W/2GX7/827	50	10000	2700	82	800	688	☐ 1,2,3,8,9
					20284	CF13DS/E/830	CFT13W/2GX7/830	50	10000	3000	82	800	688	☐ 1,2,3,8,9
					20318	CF13DS/E/841	CFT13W/2GX7/841	50	10000	4100	82	800	688	☐ 1,2,3,8,9

DULUX® D PREHEAT 2-PIN ECOLOGIC® COMPACT FLUORESCENT LAMPS

with Starter in Lamp Base for Magnetic Ballast

Nominal Wattage	Bulb	MOL			Product Number	Ordering Abbreviation	NEMA Generic Designation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens		Symbols & Footnotes
		(in)	(mm)	Base								Initial @25°C/77°F	Mean	
9	T4	4.3	110	G23-2	20537	CF9DD/827/RP	CF09W/G23/827	10	10000	2700	82	525	452	☐ 1,2,3,4,5,6
					20689	CF9DD/827	CF09W/G23/827	50	10000	2700	82	525	452	☐ 1,2,3,4,5,6
					20783	CF9DD/830	CF09W/G23/830	50	10000	3000	82	525	452	☐ 1,2,3,4,5,6
					20690	CF9DD/835	CF09W/G23/835	50	10000	3500	82	525	452	☐ 1,2,3,4,5,6
13	T4	4.6	118	GX23-2	20538	CF13DD/827/RP	CF013W/GX23/827	10	10000	2700	82	780	671	☐ 1,2,3,4,5,6
					20691	CF13DD/827	CF013W/GX23/827	50	10000	2700	82	780	671	☐ 1,2,3,4,5,6
					20705	CF13DD/830	CF013W/GX23/830	50	10000	3000	82	780	671	☐ 1,2,3,4,5,6
					20692	CF13DD/835	CF013W/GX23/835	50	10000	3500	82	780	671	☐ 1,2,3,4,5,6
18	T4	6.0	153	G24D-2	20676	CF18DD/827	CF018W/G24D/827	50	10000	2700	82	1150	1075	☐ 1,2,3,4,5,6
					20709	CF18DD/830	CF018W/G24D/830	50	10000	3000	82	1150	1075	☐ 1,2,3,4,5,6
					20677	CF18DD/835	CF018W/G24D/835	50	10000	3500	82	1150	1075	☐ 1,2,3,4,5,6
					20678	CF18DD/841	CF018W/G24D/841	50	10000	4100	82	1150	1075	☐ 1,2,3,4,5,6
26	T4	6.8	173	G24D-3	20679	CF26DD/827	CF026W/G24D/827	50	10000	2700	82	1710	1548	☐ 1,2,3,4,5,6
					20710	CF26DD/830	CF026W/G24D/830	50	10000	3000	82	1710	1548	☐ 1,2,3,4,5,6
					20680	CF26DD/835	CF026W/G24D/835	50	10000	3500	82	1710	1548	☐ 1,2,3,4,5,6

For more complete product information visit www.sylvania.com

Symbols/Footnotes on page 139-143

Lamps: 26W CFL



DULUX® T

DULUX® T/E 4-PIN ECOLOGIC® COMPACT FLUORESCENT LAMPS

Nominal Wattage	Bulb	MOL		Base	Product Number	Ordering Abbreviation	NEMA Generic Designation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens @25°C/77°F		Symbols & Footnotes
		(in)	(mm)									Initial	Mean	
13	T4	4.2	106	GX24Q-1	20893	CF13DT/E/835	CFTR13W/GX24Q/835	50	12000	3500	82	900	774	☀️ 1,2,3, 6,8,9,10
					20894	CF13DT/E/841	CFTR13W/GX24Q/841	50	12000	4100	82	900	774	☀️ 1,2,3, 6,8,9,10
18	T4	4.6	116	GX24Q-2	20760	CF18DT/E/827	CFTR18W/GX24Q/827	50	12000	2700	82	1200	1032	☀️ 1,2,3, 6,8,9,10
26	T4	5.2	124	GX24Q-3	20767	CF26DT/E/827	CFTR26W/GX24Q/827	50	12000	2700	82	1800	1548	☀️ 1,2,3, 6,8,9,10
32	T4	5.8	147	GX24Q-3	20768	CF32DT/E/827	CFTR32W/GX24Q/827	50	12000	2700	82	2400	2064	☀️ 1,2,3, 6,8,9,10,11

DULUX® T/E/IN AMALGAM, 4-PIN ECOLOGIC® COMPACT FLUORESCENT LAMPS

for Dimming and Electronic Ballast for High and Low Temp Applications

Nominal Wattage	Bulb	MOL		Base	Product Number	Ordering Abbreviation	NEMA Generic Designation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens @25°C/77°F		Symbols & Footnotes
		(in)	(mm)									Initial	Mean	
18	T4	4.4	111	GX24Q-2	20875	CF18DT/E/IN827	CFTR18W/GX24Q/827	50	12000	2700	82	1200	1032	☀️ 1,2,3, 6,8,9,10,12
					20876	CF18DT/E/IN830	CFTR18W/GX24Q/830	50	12000	3000	82	1200	1032	☀️ 1,2,3, 6,8,9,10,12
					20877	CF18DT/E/IN835	CFTR18W/GX24Q/835	50	12000	3500	82	1200	1032	☀️ 1,2,3, 6,8,9,10,12
					20878	CF18DT/E/IN841	CFTR18W/GX24Q/841	50	12000	4100	82	1200	1032	☀️ 1,2,3, 6,8,9,10,12
26	T4	5.0	126	GX24Q-3	20879	CF26DT/E/IN827	CFTR26W/GX24Q/827	50	12000	2700	82	1800	1548	☀️ 1,2,3, 6,8,9,10,12
					20880	CF26DT/E/IN830	CFTR26W/GX24Q/830	50	12000	3000	82	1800	1548	☀️ 1,2,3, 6,8,9,10,12
					20881	CF26DT/E/IN835	CFTR26W/GX24Q/835	50	12000	3500	82	1800	1548	☀️ 1,2,3, 6,8,9,10,12
					20882	CF26DT/E/IN841	CFTR26W/GX24Q/841	50	12000	4100	82	1800	1548	☀️ 1,2,3, 6,8,9,10,12
32	T4	5.6	142	GX24Q-3	20883	CF32DT/E/IN827	CFTR32W/GX24Q/827	50	12000	2700	82	2400	2064	☀️ 1,2,3, 6,8,9,10,11,12
					20884	CF32DT/E/IN830	CFTR32W/GX24Q/830	50	12000	3000	82	2400	2064	☀️ 1,2,3, 6,8,9,10,11,12
					20885	CF32DT/E/IN835	CFTR32W/GX24Q/835	50	12000	3500	82	2400	2064	☀️ 1,2,3, 6,8,9,10,11,12
					20886	CF32DT/E/IN841	CFTR32W/GX24Q/841	50	12000	4100	82	2400	2064	☀️ 1,2,3, 6,8,9,10,11,12
42	T4	6.5	163	GX24Q-4	20887	CF42DT/E/IN827	CFTR42W/GX24Q/827	50	12000	2700	82	3200	2752	☀️ 1,2,3, 6,8,9,10,11,12
					20888	CF42DT/E/IN830	CFTR42W/GX24Q/830	50	12000	3000	82	3200	2752	☀️ 1,2,3, 6,8,9,10,11,12
					20871	CF42DT/E/IN835	CFTR42W/GX24Q/835	50	12000	3500	82	3200	2752	☀️ 1,2,3, 6,8,9,10,11,12
					20890	CF42DT/E/IN841	CFTR42W/GX24Q/841	50	12000	4100	82	3200	2752	☀️ 1,2,3, 6,8,9,10,11,12
57	T4	7.76	197	GX24Q-5	20895	CF57DT/E/IN827	CFTR57W/GX24Q/827	50	12000	2700	82	4300	3698	☀️ 1,2,3, 6,8,9,10,11,12

For more complete product information visit www.sylvania.com

Symbols/Footnotes on page 139-143

Lamps: 32W CFL



DULUX® T

DULUX® T/E 4-PIN ECOLOGIC® COMPACT FLUORESCENT LAMPS

Nominal Wattage	Bulb	MOL		Base	Product Number	Ordering Abbreviation	NEMA Generic Designation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens @25°C/77°F		Symbols & Footnotes
		(in)	(mm)									Initial	Mean	
13	T4	4.2	106	GX24Q-1	20893	CF13DT/E/835	CFTR13W/GX24Q/835	50	12000	3500	82	900	774	☀️ 1,2,3, 6,8,9,10
					20894	CF13DT/E/841	CFTR13W/GX24Q/841	50	12000	4100	82	900	774	☀️ 1,2,3, 6,8,9,10
18	T4	4.6	116	GX24Q-2	20760	CF18DT/E/827	CFTR18W/GX24Q/827	50	12000	2700	82	1200	1032	☀️ 1,2,3, 6,8,9,10
26	T4	5.2	124	GX24Q-3	20767	CF26DT/E/827	CFTR26W/GX24Q/827	50	12000	2700	82	1800	1548	☀️ 1,2,3, 6,8,9,10
32	T4	5.8	147	GX24Q-3	20768	CF32DT/E/827	CFTR32W/GX24Q/827	50	12000	2700	82	2400	2064	☀️ 1,2,3, 6,8,9,10,11

DULUX® T/E/IN AMALGAM, 4-PIN ECOLOGIC® COMPACT FLUORESCENT LAMPS

for Dimming and Electronic Ballast for High and Low Temp Applications

Nominal Wattage	Bulb	MOL		Base	Product Number	Ordering Abbreviation	NEMA Generic Designation	Pkg Qty	Avg Rated Life (hrs)	CCT (K)	CRI	Approx Lumens @25°C/77°F		Symbols & Footnotes
		(in)	(mm)									Initial	Mean	
18	T4	4.4	111	GX24Q-2	20875	CF18DT/E/IN827	CFTR18W/GX24Q/827	50	12000	2700	82	1200	1032	☀️ 1,2,3, 6,8,9,10,12
					20876	CF18DT/E/IN830	CFTR18W/GX24Q/830	50	12000	3000	82	1200	1032	☀️ 1,2,3, 6,8,9,10,12
					20877	CF18DT/E/IN835	CFTR18W/GX24Q/835	50	12000	3500	82	1200	1032	☀️ 1,2,3, 6,8,9,10,12
					20878	CF18DT/E/IN841	CFTR18W/GX24Q/841	50	12000	4100	82	1200	1032	☀️ 1,2,3, 6,8,9,10,12
26	T4	5.0	126	GX24Q-3	20879	CF26DT/E/IN827	CFTR26W/GX24Q/827	50	12000	2700	82	1800	1548	☀️ 1,2,3, 6,8,9,10,12
					20880	CF26DT/E/IN830	CFTR26W/GX24Q/830	50	12000	3000	82	1800	1548	☀️ 1,2,3, 6,8,9,10,12
					20881	CF26DT/E/IN835	CFTR26W/GX24Q/835	50	12000	3500	82	1800	1548	☀️ 1,2,3, 6,8,9,10,12
					20882	CF26DT/E/IN841	CFTR26W/GX24Q/841	50	12000	4100	82	1800	1548	☀️ 1,2,3, 6,8,9,10,12
32	T4	5.6	142	GX24Q-3	20883	CF32DT/E/IN827	CFTR32W/GX24Q/827	50	12000	2700	82	2400	2064	☀️ 1,2,3, 6,8,9,10,11,12
					20884	CF32DT/E/IN830	CFTR32W/GX24Q/830	50	12000	3000	82	2400	2064	☀️ 1,2,3, 6,8,9,10,11,12
					20885	CF32DT/E/IN835	CFTR32W/GX24Q/835	50	12000	3500	82	2400	2064	☀️ 1,2,3, 6,8,9,10,11,12
42	T4	6.5	163	GX24Q-4	20887	CF42DT/E/IN827	CFTR42W/GX24Q/827	50	12000	2700	82	3200	2752	☀️ 1,2,3, 6,8,9,10,11,12
					20888	CF42DT/E/IN830	CFTR42W/GX24Q/830	50	12000	3000	82	3200	2752	☀️ 1,2,3, 6,8,9,10,11,12
					20871	CF42DT/E/IN835	CFTR42W/GX24Q/835	50	12000	3500	82	3200	2752	☀️ 1,2,3, 6,8,9,10,11,12
					20890	CF42DT/E/IN841	CFTR42W/GX24Q/841	50	12000	4100	82	3200	2752	☀️ 1,2,3, 6,8,9,10,11,12
57	T4	7.76	197	GX24Q-5	20895	CF57DT/E/IN827	CFTR57W/GX24Q/827	50	12000	2700	82	4300	3698	☀️ 1,2,3, 6,8,9,10,11,12

For more complete product information visit www.sylvania.com

Symbols/Footnotes on page 139-143

Lamps: 50W MR16



INFRARED CONSERVING HALOGEN

TRU-AIM IR® MR16

UV Filter capsule with axial filament in covered constant color, hard coated dichroic reflector and infrared reflective coating on the lamp capsule.

Watts	Bulb	Base	Product Number	Symbols & Footnotes	Ordering Abbreviation	Volts	Pkg Qty	Beam Type	Class & Filament	Avg Rated Life(hrs)	Lumens	CBCP	Beam Angle (in)	MOL (in)
20	MR16	GU5.3	58531	☉ 4,5,6,7,8	20MR16/IR/SP10C	12	20	Spot	C, AX	4000		6000	10	1 1/4
			58532	☉ 4,5,6,7,8	20MR16/IR/NFL25C	12	20	Narrow Flood	C, AX	4000		2300	25	1 1/4
			58533	☉ 4,5,6,7,8	20MR16/IR/FL40C	12	20	Flood	C, AX	4000		1000	40	1 1/4
			58838	☉ 4,5,6,7,8	20MR16/IR/WFL60C	12	20	Wide Flood	C, AX	4000		450	60	1 1/4
37	MR16	GU5.3	58641	☉ 4,5,6,8,10	37MR16/IR/SP10C	12	20	Spot	C, AX	4000		12500	10	1 1/4
			58634	☉ 4,5,6,8,10	37MR16/IR/NFL25C	12	20	Narrow Flood	C, AX	4000		4400	25	1 1/4
			58633	☉ 4,5,6,8,10	37MR16/IR/FL40C	12	20	Flood	C, AX	4000		2200	40	1 1/4
			58837	☉ 4,5,6,8,10	37MR16/IR/WFL60C	12	20	Wide Flood	C, AX	4000		1100	60	1 1/4
50	MR16	GU5.3	54175	☉ 4,5,6,8,10	50MR16/IR/SP10C	12	20	Spot	C, AX	4000		15000	10	1 1/4
			54174	☉ 4,5,6,8,10	50MR16/IR/NFL25C	12	20	Narrow Flood	C, AX	4000		5700	25	1 1/4
			54173	☉ 4,5,6,8,10	50MR16/IR/FL40C	12	20	Flood	C, AX	4000		2850	40	1 1/4
			54237	☉ 4,5,6,8,10	50MR16/IR/WFL60C	12	20	Wide Flood	C, AX	4000		1430	60	1 1/4

CAPSYLITE IR® PAR20

Watts	Bulb	Base	Product Number	Symbols & Footnotes	Ordering Abbreviation	Volts	Pkg Qty	Beam Type	Class & Filament	Avg Rated Life(hrs)	Lumens	CBCP	Beam Angle (in)	MOL (in)
40	PAR20	E26 Med	14164	★ ☉ ☉ ☉ 4,11,12	40PAR20/CAP/IR/NSP10	120	15	Narrow Spot	C, CC-8	4000	600	5000	10	3 1/4
			14166	★ ☉ ☉ ☉ 4,11,12	40PAR20/CAP/IR/NFL30	120	15	Narrow Spot	C, CC-8	4000	600	1300	30	3 1/4
			14130	★ ☉ ☉ ☉ 4,11,12	40PAR20/CAP/IR/WFL40	120	15	Wide Flood	C, CC-8	4000	600	1000	40	3 1/4

CAPSYLITE IR® PAR30

Watts	Bulb	Base	Product Number	Symbols & Footnotes	Ordering Abbreviation	Volts	Pkg Qty	Beam Type	Class & Filament	Avg Rated Life(hrs)	Lumens	CBCP	Beam Angle (in)	MOL (in)
40	PAR30	E26 Med	13968	★ ☉ ☉ ☉ 4,11,12	40PAR30/CAP/IR/NSP9	120	15	Narrow Spot	C, CC-8	4000	680	8800	9	3 3/8
			13969	★ ☉ ☉ ☉ 4,11,12	40PAR30/CAP/IR/NFL25	120	15	Narrow Flood	C, CC-8	4000	680	2300	25	3 3/8
			13970	★ ☉ ☉ ☉ 4,11,12	40PAR30/CAP/IR/FL40	120	15	Flood	C, CC-8	4000	680	1300	40	3 3/8
50	PAR30	E26 Med	14355	★ ☉ ☉ ☉ 4,11,12	50PAR30/CAP/IR/NSP9	120	15	Narrow Spot	C, CC-8	3000	900	13000	9	3 3/8
			14109	★ ☉ ☉ ☉ 1,4,11,12	50PAR30/CAP/IR/NSP9	130	15	Narrow Spot	C, CC-8	3000	900	13000	9	3 3/8
			14354	★ ☉ ☉ ☉ 4,11,12	50PAR30/CAP/IR/NFL25	120	15	Narrow Flood	C, CC-8	3000	900	2900	25	3 3/8

For more complete product information visit www.sylvania.com

Symbols/Footnotes on page 56-5

Lamps: 50W PAR20



CAPSYLITE® PAR DAYLIGHT PLUS™ PAR

Watts	Bulb	Base	Product Number	Symbols & Footnotes	Ordering Abbreviation	Volts	Pkg Qty	Beam Type	Class & Filament	Avg Rated Life(hrs)	Lumens	CBCP	Beam Angle	MOL (in)
50	PAR20	E26 Med	15226	★ 12	50PAR20DAY/NFLRP	120	6	Narrow Flood	C, CC-8	2000	460	1000	30	3 1/8
	PAR30LN	E26 Med	15227	★ 12,15	50PAR30LNDAV/WFLRP	120	6	Wide Flood	C, CC-8	2000	580	550	50	4 1/8
	PAR38	E26 Med Skt	15229	★ 12	50PAR38DAY/NFLRP	120	6	Flood	C, CC-8	2000	560	1550	30	5 1/8
60	PAR38	E26 Med Skt	15252	★ 12	60PAR38CAPDAY/SP9	120	15	Spot	C, CC-8	2500	725	13500	9	5 7/8
			15251	★ 12	60PAR38CAPDAY/FL30	120	15	Flood	C, CC-8	2500	725	2150	30	5 7/8
75	PAR30LN	E26 Med	15228	★ 12,15	75PAR30LNDAV/WFLRP	120	6	Wide Flood	C, CC-8	2000	1000	1000	50	4 1/8
	PAR38	E26 Med Skt	15230	★ 12	75PAR38DAY/NFLRP	120	6	Flood	C, CC-8	2000	960	2800	30	5 7/8

CAPSYLITE® PAR14

Watts	Bulb	Base	Product Number	Symbols & Footnotes	Ordering Abbreviation	Volts	Pkg Qty	Beam Type	Class & Filament	Avg Rated Life(hrs)	Lumens	CBCP	Beam Angle	MOL (in)
35	PAR14	E26 Med	14553	12,16	35PAR14CAP/FL50RP	120	6	Flood	C, CC-8	2000	300	85	50	2 1/8

DESIGNER 16® - CAPSYLITE® PAR16

Watts	Bulb	Base	Product Number	Symbols & Footnotes	Ordering Abbreviation	Volts	Pkg Qty	Beam Type	Class & Filament	Avg Rated Life(hrs)	Lumens	CBCP	Beam Angle	MOL (in)
50	PAR16	GU10	59020	★	50PAR16HALGU10FLCLAM	120	6	Flood	C, CC-2V	1000	400	640	40	2 1/8
			59024	★	50PAR16CAPGU10FL40	120	10	Flood	C, CC-2V	1000	400	640	40	2 1/8
60	PAR16	E26 Med	59037	12,16	60PAR16HALNSP10RP	120	6	Narrow Spot	C, CC-8	2000	650	5000	10	2 1/8
			59032	12,16	60PAR16CAPNSP10	120	15	Narrow Spot	C, CC-8	2000	650	5000	10	2 1/8
			59040	1,12,16	60PAR16CAPNSP10 @ 120 volts, approximate 53 watts, 495 lumens, 4000 hours	130	15	Narrow Spot	C, CC-8	2000	650	5000	10	2 1/8
			59031	12,16	60PAR16HAL/NFL30RP	120	6	Narrow Flood	C, CC-8	2000	650	1300	30	2 1/8
			59030	12,16	60PAR16CAP/NFL30	120	15	Narrow Flood	C, CC-8	2000	650	1300	30	2 1/8
			59038	1,12,16	60PAR16CAP/NFL30 @ 120 volts, approximate 53 watts, 495 lumens, 4000 hours	130	15	Narrow Flood	C, CC-8	2000	650	1300	30	2 1/8
75	PAR16	E26 Med	59035	12,16	75PAR16HALNSP10RP	120	6	Narrow Spot	C, CC-8	2000	900	7500	10	2 1/8
			59036	12,16	75PAR16CAPNSP10	120	15	Narrow Spot	C, CC-8	2000	900	7500	10	2 1/8
			59044	1,12,16	75PAR16CAPNSP10 @ 120 volts, approximate 66 watts, 685 lumens, 4000 hours	130	15	Narrow Spot	C, CC-8	2000	900	7500	10	2 1/8
			59033	12,16	75PAR16HAL/NFL30RP	120	6	Narrow Flood	C, CC-8	2000	900	1900	30	2 1/8
			59034	12,16	75PAR16CAP/NFL30	120	15	Narrow Flood	C, CC-8	2000	900	1900	30	2 1/8
			59042	1,12,16	75PAR16CAP/NFL30 @ 120 volts, approximate 66 watts, 685 lumens, 4000 hours	130	15	Narrow Flood	C, CC-8	2000	900	1900	30	2 1/8

For more complete product information visit www.sylvania.com

Symbols/Footnotes on page 56-5

Lamps: 39W T4.5



METALARC® METAL HALIDE
METALARC POWERBALL® CERAMIC
 High CRI, Pulse Start, UV Stop Enclosed Fixtures Only

Watts	Bulb	Base	Product Number	Ordering Abbreviation	ANSI Code	Pkg Qty	Lamp Finish	Operating Position	Fix Req	Avg Rated Life (hrs)	Approx Lumens (initial)	Approx Lumens (mean)	CRI	CCT (K)	Symbols & Footnotes
39	T4.5	G8.5	64791	MC39TCUG8.5E830	M130/E	12	Clear	Universal	E	9000	3300	2640	82	3000	☐ 1,2,3, 4,5
	T6	G12	64363	MC39T6UG12E830	M130/E	12	Clear	Universal	E	9000	3400	2720	82	3000	☐ 1,2,3, 4,5
70	T4.5	G8.5	64792	MC70TCUG8.5E830	M139/E	12	Clear	Universal	E	9000	6600	5280	83	3000	☐ 1,2,3, 4,5,6
	T6	G12	64361	MC70T6UG12E830	M139/E	12	Clear	Universal	E	9000	6700	5360	87	3000	☐ 1,2,3, 4,5,6
			64338	MC70T6UG12940	M139/E	12	Clear	Universal	E	9000	5800	4640	90	4200	☐ 1,2,3, 4,5,6
		R7S RSC	64793	MC70T6DE830	M139/E	12	Clear	HOR 45° E		12000	6600	5120	88	3000	☐ 1,2,4, 5,6,7
150	T6	G12	64337	MC150T6UG12940	M102/E	12	Clear	Universal	E	9000	12700	10160	90	4200	☐ 1,2,3, 5,8
	T7.5	G12	64359	MC150T7.5G12U830	M102/E	12	Clear	Universal	E	9000	14500	11600	89	3000	☐ 1,2,3, 5,8
		R7S RSC	64794	MC150T7.5DE830	M102/E	12	Clear	HOR 45° E		12000	14800	11840	91	3000	☐ 1,2,5, 9

METALARC POWERBALL CERAMIC
 High CRI, Pulse Start, UV Stop Open or Enclosed Fixtures

Watts	Bulb	Base	Product Number	Ordering Abbreviation	ANSI Code	Pkg Qty	Lamp Finish	Operating Position	Fix Req	Avg Rated Life (hrs)	Approx Lumens (initial)	Approx Lumens (mean)	CRI	CCT (K)	Symbols & Footnotes
70	E17	E26 Med	64739	MCP70UMED830	M139/O	12	Clear	Universal	O	12000	5900	4700	88	3000	☐ 1,5,6, 10,11
			64740	MCP70CUMED830	M139/O	12	Coated	Universal	O	12000	5500	4400	88	3000	☐ 1,5,6, 10,11
100	E17	E26 Med	64743	MCP100UMED830	M90/O	12	Clear	Universal	O	12000	9000	7200	85	3000	☐ 1,5,10, 11,12
			64744	MCP100CUMED830	M90/O	12	Coated	Universal	O	12000	8500	6900	85	3000	☐ 1,5,10, 11,12
150	E17	E26 Med	64741	MCP150UMED830	M102/O	12	Clear	Universal	O	12000	13000	11000	89	3000	☐ 1,5,8, 10,11
			64742	MCP150CUMED830	M102/O	12	Coated	Universal	O	12000	12000	10000	89	3000	☐ 1,5,8, 10,11
250	BT28	EX39 Excl Mogul	64786	MCP250PSBU-ONLY940	M153/O	6	Clear	BU 15°	O	15000	24000	19200	94	4200	☐ 1,10,11, 13
			64821	MCP250CPSBU-ONLY940	M153/O	6	Coated	BU 15°	O	15000	22500	18000	94	4000	☐ 1,10,11, 13

METALARC POWERBALL CERAMIC - PAR LAMPS
 High CRI, Pulse Start, UV Stop, PAR Type Open or Enclosed Fixtures

Watts	Bulb	Base	Product Number	Ordering Abbreviation	ANSI Code	Pkg Qty	Beam Type	Beam Angle	Operating Position	Fix Req	Avg Rated Life (hrs)	Approx Lumens (initial)	Approx Lumens (mean)	CRI	CCT (K)	Symbols & Footnotes
39	PAR20	E26 Med	64747	MCP39PAR20U830SP	M130/O	12	SP	10	Universal	O	9000	22000	2000	85	2900	☐ 1,3,4, 5,10,11
			64748	MCP39PAR20U830FL	M130/O	12	FL	30	Universal	O	9000	5000	2000	85	2900	☐ 1,3,4, 5,10,11
	PAR30LN	E26 Med	64755	MCP39PAR30LNUNU830SP	M130/O	6	SP	10	Universal	O	9000	39600	2300	85	2900	☐ 1,3,4, 5,10,11

For more complete product information visit www.sylvania.com

Symbols/Footnotes on page 93-94

Lamps: 70W T6



METALARC® METAL HALIDE
METALARC POWERBALL® CERAMIC
 High CRI, Pulse Start, UV Stop Enclosed Fixtures Only

Watts	Bulb	Base	Product Number	Ordering Abbreviation	ANSI Code	Pkg Qty	Lamp Finish	Operating Position	Fix Req	Avg Rated Life (hrs)	Approx Lumens (initial)	(mean)	CRI	CCT (K)	Symbols & Footnotes
39	T4.5	G8.5	64791	MC39TCU/G8.5/830	M130/E	12	Clear	Universal	E	9000	3300	2640	82	3000	☐ 1,2,3, 4,5
	T6	G12	64363	MC39T6U/G12/830	M130/E	12	Clear	Universal	E	9000	3400	2720	82	3000	☐ 1,2,3, 4,5
70	T4.5	G8.5	64792	MC70TCU/G8.5/830	M139/E	12	Clear	Universal	E	9000	6600	5280	83	3000	☐ 1,2,3, 4,5,6
	T6	G12	64361	MC70T6U/G12/830	M139/E	12	Clear	Universal	E	9000	6700	5360	87	3000	☐ 1,2,3, 4,5,6
			64338	MC70T6U/G12/940	M139/E	12	Clear	Universal	E	9000	5800	4640	90	4200	☐ 1,2,3, 4,5,6
		R7S RSC	64793	MC70T6/DE/830	M139/E	12	Clear	HOR 45° E		12000	6600	5120	88	3000	☐ 1,2,4, 5,6,7
150	T6	G12	64337	MC150T6U/G12/940	M102/E	12	Clear	Universal	E	9000	12700	10160	90	4200	☐ 1,2,3, 5,8
	T7.5	G12	64359	MC150T7.5G12U/830	M102/E	12	Clear	Universal	E	9000	14500	11600	89	3000	☐ 1,2,3, 5,8
			64794	MC150T7.5/DE/830	M102/E	12	Clear	HOR 45° E		12000	14800	11840	91	3000	☐ 1,2,5, 9

METALARC POWERBALL CERAMIC
 High CRI, Pulse Start, UV Stop Open or Enclosed Fixtures

Watts	Bulb	Base	Product Number	Ordering Abbreviation	ANSI Code	Pkg Qty	Lamp Finish	Operating Position	Fix Req	Avg Rated Life (hrs)	Approx Lumens (initial)	(mean)	CRI	CCT (K)	Symbols & Footnotes
70	E17	E26 Med	64739	MCP70U/MED/830	M139/O	12	Clear	Universal	O	12000	5900	4700	88	3000	☐ 1,5,6, 10,11
			64740	MCP70C/U/MED/830	M139/O	12	Coated	Universal	O	12000	5500	4400	88	3000	☐ 1,5,6, 10,11
100	E17	E26 Med	64743	MCP100U/MED/830	M90/O	12	Clear	Universal	O	12000	9000	7200	85	3000	☐ 1,5,10, 11,12
			64744	MCP100C/U/MED/830	M90/O	12	Coated	Universal	O	12000	8500	6900	85	3000	☐ 1,5,10, 11,12
150	E17	E26 Med	64741	MCP150U/MED/830	M102/O	12	Clear	Universal	O	12000	13000	11000	89	3000	☐ 1,5,8, 10,11
			64742	MCP150C/U/MED/830	M102/O	12	Coated	Universal	O	12000	12000	10000	89	3000	☐ 1,5,8, 10,11
250	BT28	EX39 Excl Mogul	64786	MCP250PS/BU-ONLY/940	M153/O	6	Clear	BU 15°	O	15000	24000	19200	94	4200	☐ 1,10,11, 13
			64821	MCP250C/PS/BU-ONLY/940	M153/O	6	Coated	BU 15°	O	15000	22500	18000	94	4000	☐ 1,10,11, 13

METALARC POWERBALL CERAMIC - PAR LAMPS
 High CRI, Pulse Start, UV Stop, PAR Type Open or Enclosed Fixtures

Watts	Bulb	Base	Product Number	Ordering Abbreviation	ANSI Code	Pkg Qty	Beam Type	Beam Angle	Operating Position	Fix Req	Avg Rated Life (hrs)	Approx Lumens (initial)	(mean)	CRI	CCT (K)	Symbols & Footnotes
39	PAR20	E26 Med	64747	MCP39PAR20U/830/SP	M130/O	12	SP	10	Universal	O	9000	22000	2000	85	2900	☐ 1,3,4, 5,10,11
			64748	MCP39PAR20U/830/FL	M130/O	12	FL	30	Universal	O	9000	5000	2000	85	2900	☐ 1,3,4, 5,10,11
	PAR30LN	E26 Med	64755	MCP39PAR30LN/830/SP	M130/O	6	SP	10	Universal	O	9000	39600	2300	85	2900	☐ 1,3,4, 5,10,11

For more complete product information visit www.sylvania.com

Symbols/Footnotes on page 93-94

Fluorescent Dimming Ballasts**Eco-10® 10%****Lighting Management Dimming**

Eco-10 1 08.08.08

Eco-10 Overview

Eco-10 lighting management electronic dimming ballasts are designed to maximize the benefits of a lighting management system. Eco-10 offers 100% to 10% dimming, and is ideal for use in any space where saving energy is the primary goal of the design.

Features

- Continuous, flicker-free dimming from 100% to 10%
- Standard 3-wire line-voltage phase-control technology for consistent fixture-to-fixture dimming performance
- Models available for T5 and T5-HO linear, T8 linear and U-bent, and T5 twin-tube lamps
- Programmed rapid start design preheats lamp cathodes before applying full arc voltage
- Lamps turn on to any dimmed level without flashing to full brightness
- Low harmonic distortion throughout the entire dimming range maintains power quality
- Frequency of operation ensures that ballast does not interfere with infrared devices operating between 38 and 42 kHz
- Inrush current limiting circuitry eliminates circuit breaker tripping, switch arcing, and relay failure
- End-of-lamp-life protection circuitry (for T5 and T5-HO linear models) ensures safe operation throughout entire lamp life cycle
- For linear lamps, ballasts maintain consistent light output for different lamp lengths, ensuring uniformity
- Ultra-quiet operation
- Protected from miswires of any input power to control lead
- 100% compatible with all Lutron 3-wire fluorescent controls
- 100% performance tested at factory
- Designed and assembled in the USA
- 5-year limited warranty with Lutron field service commissioning (3-year standard warranty) from date of purchase

**Eco-10, case type C**

1.18 in. w (30 mm) x 1.00 in. h (25 mm) x
18.00 in. l (457 mm)

**Eco-10, case type D**

1.58 in. w (40 mm) x 1.00 in. h (25 mm) x
9.50 in. l (241 mm)

**Eco-10, case type F**

2.38 in. w (60 mm) x 1.50 in. h (38 mm) x
9.50 in. l (241 mm)

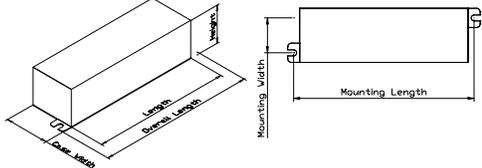
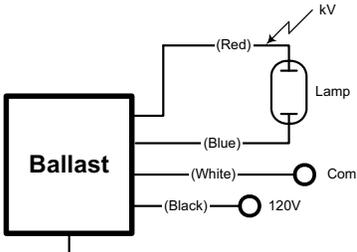
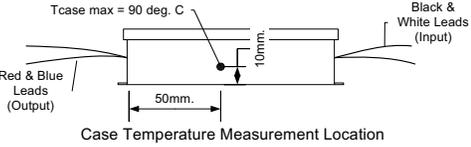
Appendix C - Ballasts

Lutron® | Hi-lume®, Compact SE™, Eco-10®
277 volt 3-wire dimming ballasts

For the latest model numbers:
www.lutron.com/ballasts

Lamp Type	Lamp Watts (Length)	Lamps per Ballast	Case Type ¹	1 % Dimming		10 % Dimming	Ballast Current ² – Amps	
				Hi-lume	5 % Dimming			
T5 Linear  5/8 in Dia	14 W (21.6 in)	1	C ³	—		E 3 T514 C 277 1	.08	
		2	C ³	—		E 3 T514 C 277 2	.14	
	21 W (33.4 in)	1	C ³	—		E 3 T521 C 277 1	.11	
		2	C ³	—		E 3 T521 C 277 2	.19	
	28 W (45.2 in)	1	C ³	—		ECO-T528-277-1	.14	
		2	C ³	—		ECO-T528-277-2	.25	
T5-HO Linear  5/8 in Dia	24 W (21.6 in)	1	C ³	FDB-T524-277-1		ECO-T524-277-1	.13	
		2	C ³	FDB-T524-277-2		ECO-T524-277-2	.20	
	39 W (33.4 in)	1	C ³	FDB-T539-277-1		ECO-T5H39-277-1	.17	
		2	C ³	FDB-T539-277-2		ECO-T5H39-277-2	.31	
	54 W (45.2 in)	1	C ³	FDB-T554-277-1		ECO-T554-277-1	.25	
		2	C ³	FDB-T554-277-2		ECO-T554-277-2	.45	
T8 Linear and U-Bent  1 in Dia	17 W (24 in)	1	F	FDB-2427-277-1		ECO-T817-277-1	.08	
		2	F	FDB-2427-277-2		ECO-T817-277-2	.15	
		3	F	FDB-2427-277-3		ECO-T817-277-3	.20	
	25 W (36 in)	1	F	FDB-3627-277-1		ECO-T825-277-1	.12	
		2	F	FDB-3627-277-2		ECO-T825-277-2	.19	
		3	F	FDB-3627-277-3		—	.28	
		32 W (48 in)	1	F		FDB-4827-277-1	ECO-T832-277-1	.14/.15 ⁴
			1	D		—	ECO-T832-277-1-L	.14
		1	D	—		ECO-T832-277-1-T	.14	
		2	F	FDB-4827-277-2		ECO-T832-277-2	.25/.22 ⁴	
	2	D	—	ECO-T832-277-2-L	.23			
	2	D	—	ECO-T832-277-2-T	.23			
40 W (60 in)	1	F	FDB-6027-277-1		—	.16		
	2	F	FDB-6027-277-2		—	.30		

1 For case type information, see pages 36 and 37.
 2 To calculate ballast input power, use the following formula: Watts = Ballast Current x 277.
 3 Standard with terminals. Leaded options available. Please consult Lutron.
 4 Eco-10 ballast current.

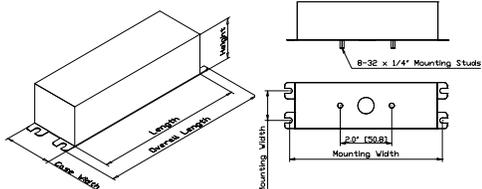
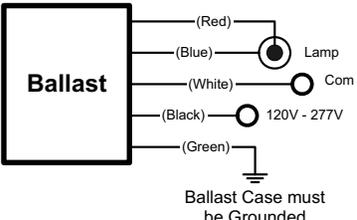
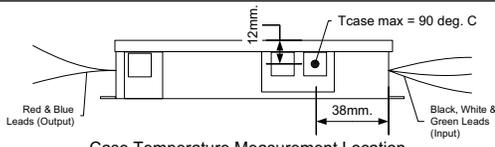
		e-Vision® Electronic Ballast for Metal Halide Lamps					Catalog Number RMH-20-K For 22W Metal Halide Lamps ANSI M175 120V 50/60Hz Electronic Status: Released											
DIMENSIONS AND DATA																		
Lamp Data		Input Volts	Catalog Number*	Line Current (Amps)	Input Power (W)	Ballast Factor	Max THD (%)	Min Power Factor	Wiring Dia	Figure	Weight (lb)	Max Distance to Lamp (ft)						
Number	Watts																	
22W Watt Lamp, ANSI Code M175 Minimum Starting Temp -30°C/-20°F																		
1	22	120	RMH-20-K-xxx	0.23	26	1.0	15%	0.90	4	K	0.4	6						
 <p style="text-align: center;">Figure K</p> <p> CASE LENGTH = 104mm [4.1"] MOUNTING LENGTH = 114mm [4.5"] MOUNTING WIDTH = 13.5mm [0.5"] OVERALL LENGTH = 119mm [4.7"] CASE WIDTH = 34mm [1.3"] HEIGHT = 30.5mm [1.2"] </p>						 <p style="text-align: center;">Ballast Case must be Grounded</p> <p style="text-align: center;">Wiring Diagram 4</p> <p style="text-align: center;">  </p>												
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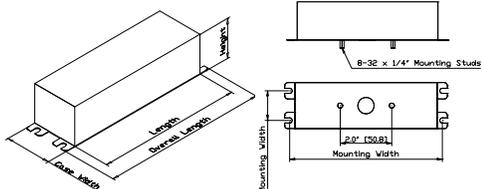
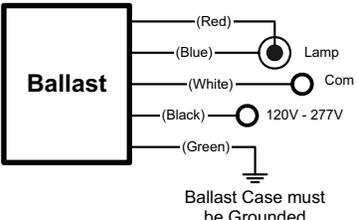
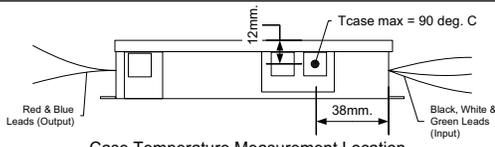
Appendix C - Ballasts

		e-Vision® Electronic Ballast for Metal Halide Lamps				Catalog Number IMH-70-J For 70W Metal Halide Lamps ANSI M98, M143 or M139 120-277V 50/60Hz Electronic Status: Preliminary										
DIMENSIONS AND DATA																
Lamp Data		Input Volts	Catalog Number*	Line Current (Amps)	Input Power (W)	Ballast Factor	Max THD (%)	Min Power Factor	Wiring Dia	Figure	Weight (lb)	Max Distance to Lamp (ft)				
Number	Watts															
70W Watt Lamp, ANSI Code M M98, M143 or M139 Minimum Starting Temp -30°C/-20°F																
1	70	120	IMH-70-J-xxx	0.67	80	1.0	15%	0.90	3	J	0.9	5				
		277		0.30	79											
<p>Figure J</p>  <p> CASE LENGTH = 5.51" [140mm] MOUNTING LENGTH = 5.71" [145mm] MOUNTING WIDTH = 1.08" [27mm] OVERALL LENGTH = 5.87" [149mm] CASE WIDTH = 1.81" [46mm] HEIGHT = 1.18" [30mm] </p>						 <p>Wiring Diagram 3</p> <p>Ballast Case must be Grounded</p>										
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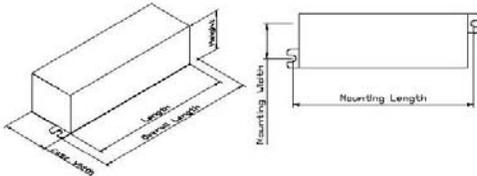
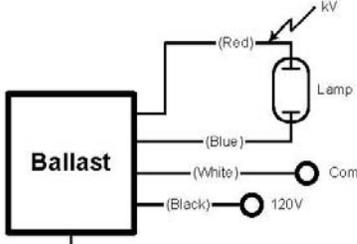
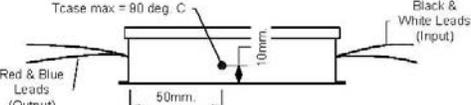
		e-Vision® Electronic Ballast for Metal Halide Lamps				Catalog Number IMH-70-J For 70W Metal Halide Lamps ANSI M98, M143 or M139 120-277V 50/60Hz Electronic Status: Preliminary										
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Lamp Data		Input Volts	Catalog Number*	Line Current (Amps)	Input Power (W)	Ballast Factor	Max THD (%)	Min Power Factor	Wiring Dia	Figure	Weight (lb)	Max Distance to Lamp (ft)				
Number	Watts															
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		277		0.30	79											
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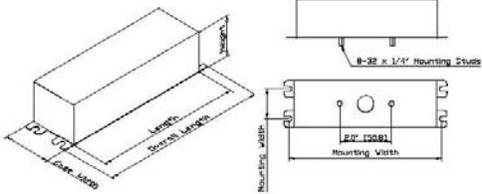
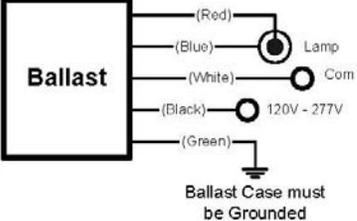
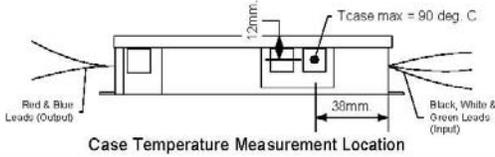
Appendix C - Ballasts

		e-Vision® Electronic Ballast for Metal Halide Lamps				Catalog Number RMH-39-K For 39W Metal Halide Lamps ANSI M130 120V 50/60Hz Electronic Status: Released												
										DIMENSIONS AND DATA								
Lamp Data		Input Volts	Catalog Number*	Line Current (Amps)	Input Power (W)	Ballast Factor	Max THD (%)	Min Power Factor	Wiring Dia	Figure	Weight (lb)	Max Distance to Lamp (ft)						
Number	Watts																	
39W Watt Lamp, ANSI Code M130 Minimum Starting Temp -30°C/-20°F																		
1	39	120	RMH-39-K-xxx	0.40	45	1.0	15	0.9	4	K	0.5	6						
 <p style="text-align: center;">Figure K</p> <p> CASE LENGTH = 104mm [4.1"] MOUNTING LENGTH = 13.5mm [0.5"] MOUNTING WIDTH = 114mm [4.5"] OVERALL LENGTH = 113mm [4.4"] CASE WIDTH = 33mm [1.3"] HEIGHT = 30mm [1.2"] </p>						 <p style="text-align: center;">Wiring Diagram 4</p> <p style="text-align: center;">Ballast Case must be Grounded</p>												
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Revised 1/16/06

		e-Vision® Electronic Ballast for Metal Halide Lamps				Catalog Number IMH-70-J For 70W Metal Halide Lamps ANSI M98, M143 or M139 120-277V 50/60Hz Electronic Status: Preliminary										
DIMENSIONS AND DATA																
Lamp Data		Input Volts	Catalog Number*	Line Current (Amps)	Input Power (W)	Ballast Factor	Max THD (%)	Min Power Factor	Wiring Dia	Figure	Weight (lb)	Max Distance to Lamp (ft)				
Number	Watts															
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1	70	120	IMH-70-J-xxx	0.67	80	1.0	15%	0.90	3	J	0.9	5				
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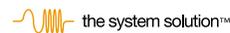
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Appendix C - Ballasts

OPTOTRONIC® OTDIM Module							OT DIM
Item Number	Description	Nominal Input Voltage (VDC)	Nominal Input Current (A)	Control Voltage (VDC)	Output Power (W)	Max. Output Current (A)	Performance Guide
51516	OTDIM	10.5 24	5.3 5.3	0-10VDC 0-10VDC	0-52.5 0-120	5 5	Dim module shall be an LED OPTOTRONIC electronic dimming module with 10 - 24 VDC input, with 0 -10 VDC control voltage.
Specifications							System Life / Warranty
<p>Dimensions: 6.77" L x 1.65" W x 0.79" H (172mm L x 42mm W x 20mm H)</p> <p>Lead Lengths: Non-lead</p> <p>Wiring Requirements: Input, load and control wires: 14AWG solid or stranded Cu only</p>				<p>Packaging: Quantity: 20 pieces/carton Weight: 0.165 lbs ea. (approx.) 3.3 lbs/carton</p>		<p>Dim Module Input Voltage Range: 9.5-25VDC Input Current: 5.3 Amps max. Output Frequency: 135 Hz Output Current: 5 Amps max. Dimming Range: 0 - 100% Control Voltage: 0 - 10 VDC, 0.6 ma max. Temp. Range: -20°C through +50°C Max. Case Temperature: 70°C Color Mixing: Yes*</p> <p>* For compatibility information with color mixing protocols/1-10V dimming controls, contact OSRAM SYLVANIA.</p>	
							<p>OPTOTRONIC OTDIM are warranted for 5 years. OPTOTRONIC and QUICKTRONIC Products are covered by our QUICK 60+ system warranty, a comprehensive light source, ballast and power supply system warranty. For additional details, refer to our latest version of the QUICK 60+ warranty bulletin.</p>
<p>Wiring Diagram:</p>							Ordering Guide
<p>Item Number _____ 51516 OT DIM</p> <p>OPTOTRONIC _____</p> <p>Dimming Module _____</p>							<p>Specifications subject to change without notice.</p>

OSRAM SYLVANIA National Customer Support Center
 1-800-LIGHTBULB (1-800-544-4828)
 www.sylvania.com





Universal Outdoor Drivers for 12V and 24V LED systems



Applications

- Orientation/Step Lighting
- Architectural Lighting
- Channel Letters
- Contour Lighting
- Edge Lighting



LEDs have evolved into a practical, flexible light source for a wide variety of illumination applications. Common LED products available in the market today are configured in a series-parallel array – designed to be powered by a suitable 24vdc driver – which allows flexibility to connect variable load levels. These operating voltages have become the standard in the industry.

The Brain Behind the Bright Idea
Xitanium LED drivers from Advance are designed specifically for 24V LED systems and incorporate features that enable broad commercialization of end-use solid-state lighting products.

Features

- UL Class 2
- UL Outdoor Damp location rated - IP 66
- Ultra small, compact size
- Extreme low temperature Performance (-40°C)
- Generous high temperature capability (+60°C)
- Tightly regulated output (1% line, 5% load)
- 5 year warranty
- Powered by Advance

Benefits

- Limited output voltage and current plus isolation for safe operation
- Fully potted for moisture resistance and thermal benefits
- Facilitates new, low-profile fixture design
- Allows use in any outdoor application
- Margin flexibility to facilitate fixture design
- Consistent light output across line and load levels
- Peace of mind for your new products and for end users...from the industry's most trusted component maker
- Advance is preferred by end users – Enhance the value of your product

Quick Selection Table

Catalog Number	Description	Application
LEDINTA0024V41FO	Intellivolt 100 Watt 24Vdc Outdoor	• 24Vdc LED Systems

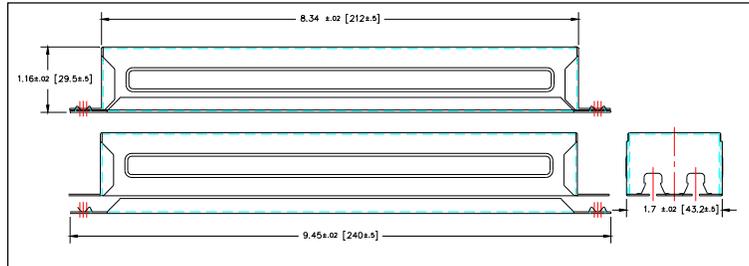
LED Driver Specifications

Description	Catalog Number	Input			Output			Case Temp Max (°C)	Figure	Weight (Grams)
		Volts (V)	Power Max (W)	Current Max (A)	Power Max (W)	Voltage Nom (V)	Current Max (A)			
100 Watt	LEDINTA0024V41FO	120	117.0	0.98	100.0	24.0	4.1	90	A	640
		230		0.51						
		277		.042						

Total Harmonic Distortion: 20% max
 Power Factor: 90% min
 Line Regulation: 1% output variation across input voltage range
 Load Regulation: 5% output variation across input voltage range
 Current Crest Factor: 1.5 max
 Environmental Protection: IP66 outdoor rated
 EMI: FCC47 SubPart15, CISPR15 and CISPR22 Class A
 Protection: Meet UL1310 for Class 2; Inherent short-circuit protection, self-limited; overload protected; 3.2KV output insulation
 AC Input and DC Output: 2 (0.78mm²) Solid Copper Wires, 15cm long

Dimensions

Fig. A



Advance, A Division of Philips Electronics North America · 10275 W Higgins Road · Rosemont, IL 60018 · USA
 Tel: + 1 847 390-5205 · Fax: + 1 847 390-5264 · Revised 09/05PJJ

LightSaver® LS-101 Daylighting Controller



PROJECT
LOCATION/TYPE

Product Overview

Description

The LS-101 Daylighting Controller is a single zone, ON/OFF device which can be installed in an open or closed loop application to turn lights off automatically when sufficient natural daylight is present. It consists of an advanced digital multi-band photosensor that measures light similar to the way the human eye perceives it, an on-board microcontroller, and an LCD display. This photosensor is positioned behind a 100° cone that cuts off unwanted light, preventing false triggering.

Operation

The LS-101 is a self-contained 24 VDC device with an extended range of 1-1400 fc that only requires a low voltage power pack to operate. By adjusting the setpoints, it will turn lighting systems off when the ambient light levels exceed the OFF setpoint, and will turn lighting systems back on when natural light levels have fallen far enough to warrant it. Because of its factory presets, many set-up applications require little or no adjustment of the settings. The LS-101 is expandable with a low voltage wall switch to enable manual override or with an occupancy sensor to enable its 'Hold On While Occupied' feature.

Features

- Easy-to-read LCD Display prompts installer through set-up and accurately reflects the current control mode and light level.
- Four user-adjustable parameters: ON Setpoint, OFF Setpoint, OFF Setpoint Time Delay, and 'Hold On While Occupied' Mode (if wired with an occupancy sensor)
- Test Mode overrides the programmed Time Delay to allow installer to check if settings are correct.
- Control load status verification allows testing and confirmation that the wiring is correct by pressing the select button
- Manual Override for one hour (if wired with a low voltage, push-button wall switch)

On, Off & Deadband Settings

The LS-101 features adjustable settings for ON setpoint, OFF setpoint and time delay, should adjustment be required. Adjusting the ON setpoint will automatically calculate your OFF setpoint to a predetermined deadband setting. The deadband can be adjusted to a value of 25%, 50%, 75% or 100% above the ON setpoint. When the sensed light level drops below the ON setpoint for 20 seconds, the output signal will switch on. And when the sensed light level exceeds the OFF setpoint for the length of the time delay, the output signal will switch OFF. The time delay can be adjusted to 3, 10, 20 or 30 minutes.

Applications

The LS-101 Daylighting Controller can be used to control any type of lighting: incandescent, fluorescent, compact fluorescent (CFL) and HID. The sensors work in peripheral offices, skylit areas, cafeterias, warehouses and any other indoor areas with natural light access.

- Meets Section 119's requirement for daylighting in California's Title 24 Lighting Code.
- LED status indicator identifies if the LS-101 is in Override or Test Mode, or if the device has switched the lights on or off.
- Two mounting options for either top-lit or side-lit applications
- Low voltage leads are color coded to match wire colors on the power pack.
- Shape and design developed to prevent mis-alignments.
- Can be programmed in most daylight conditions

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E17

Appendix G - Lighting Controls



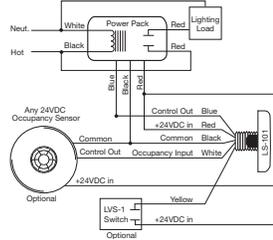
DAYLIGHTING CONTROLS

Specifications

- Digital Multi-Band Photosensor Range: 1-1400 foot candles
- ON Setpoint Range: 1-850 foot candles
- Status Indicator: Multi-function green LED
- Power Requirements: 12/24 VDC; 7 mA typical
- Output Signal: 24VDC; maximum 120 mA
- Location: Suitable for dry interior locations
- Environment: 32 to 120°F, less than 90% rh
- Dimensions: 2.4" diameter x 0.7" deep (61mm x 17mm)
- Five-year warranty
- UL listed

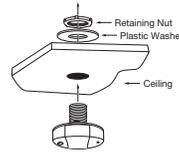
Wiring & Installation Location

Wiring Diagram

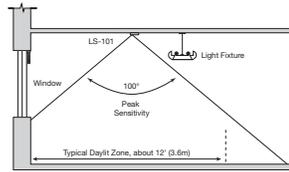


For other wiring diagrams, please visit the CAD Resource Center at www.wattstopper.com

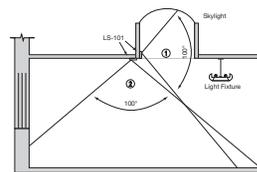
Mounting Installation



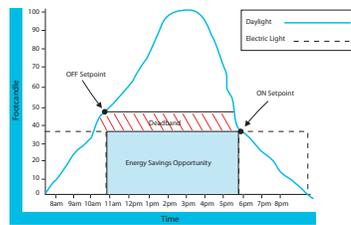
Side Lighting Application



Top Lighting Application



Deadband Level Chart



If the LS-101's photosensor lighting level drops below the ON setpoint, the lights will remain on. If the sensor's lighting level rises above the OFF setpoint, the LS-101 will automatically turn the lights off. If the sensor's lighting level remains in the predetermined deadband range (25%, 50%, 75% or 100%) the lighting will be passive until the sensor's level reaches the high or low setpoints.

Ordering Information

Catalog No.	Voltage	Current	Photosensor Range	Deadband Adjustment Range
LS-101	12-24 VDC	7 mA Typical	1-1400 foot candles	25%, 50%, 75% & 100% above the ON setpoint

Pub. No. 24702

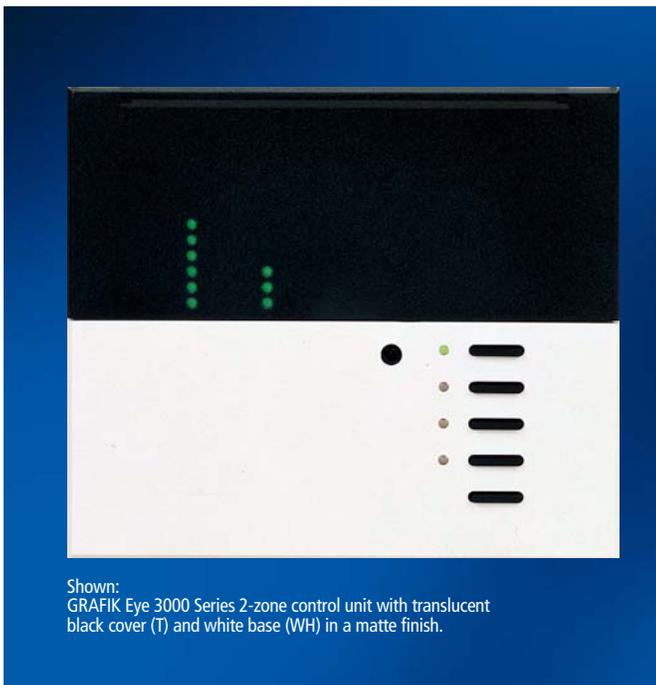
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E18

GRAFIK Eye® 3000 Series

The World's Finest Multi-Scene Preset Lighting Control

NETWORKABLE UNITS WITH ADVANCED FEATURES



Shown:
GRAFIK Eye 3000 Series 2-zone control unit with translucent black cover (T) and white base (WH) in a matte finish.

Product Family Features

- Control every light in the room with a single touch
- Programmable fade times provide smooth transitions between lighting scenes
- Easy integration with controllable window treatments and projection screens
- Offers multi-location control in many elegant wallstation styles
- Integration to other systems through contact closures or RS-232 interfaces

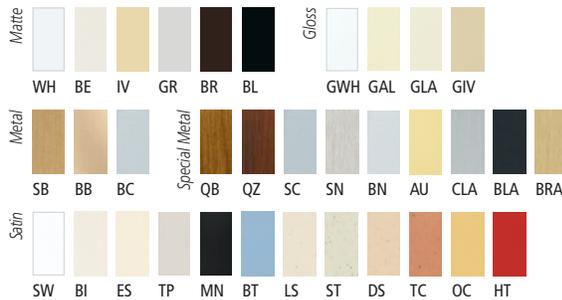
Specification Features

- Square law dimming
- Lutron's patented RTISS™ circuitry maintains constant light levels under changing power line conditions
- Lightning strike surge protection to 6000V, 3000A
- Positive air-gap off
- Power failure memory
- Electrostatic discharge protection

System Features

- Up to 8 main units (for a maximum of 48 lighting zones)
- Up to 16 wallstations/control interfaces (for a total of 24 points of control)

Color Palette (For latest color information, visit www.lutron.com)



Appendix G - Lighting Controls

Wiring Type Key

- TYPE A 12 AWG (120/277V)
- - - - TYPE B Class 2 PELV wires

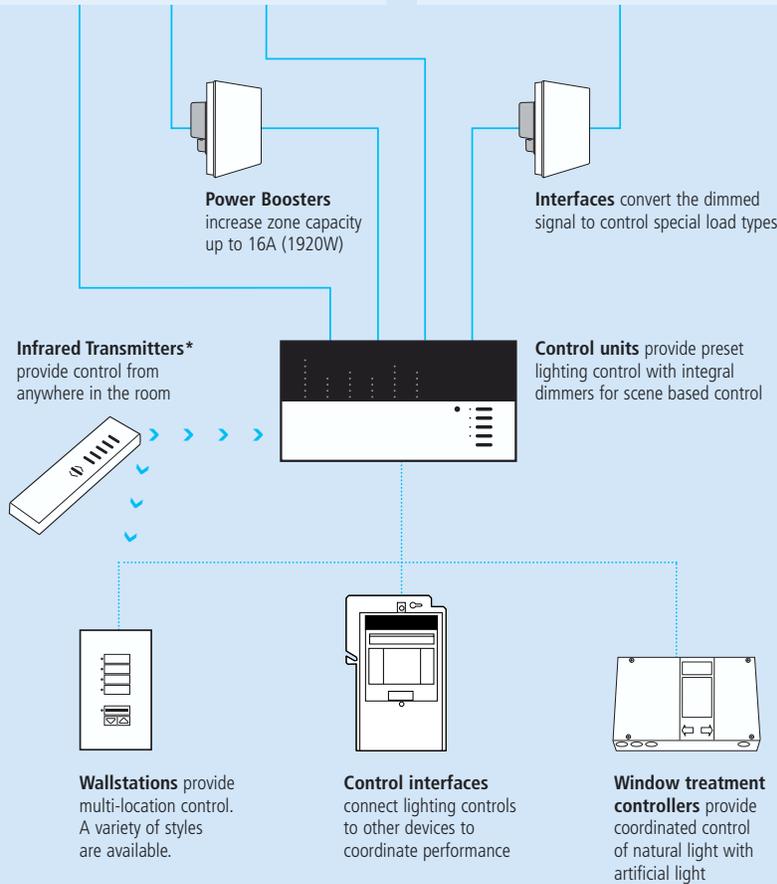
System Operation

Sources Controlled Directly:

- Incandescent
- Magnetic Low Voltage
- Neon/Cold Cathode
- Fluorescent
Tu-Wire[®] fluorescent dimming ballasts only
- non-dim
All popular sources

Sources Requiring an Interface:

- Electronic Low Voltage
- 3-Wire Fluorescent
- 0-10V Fluorescent



* Requires line of sight to the control unit

Entire-Room Controls

GRAFIK Eye® Special Product Features

2-Zone (Cover Open, Actual Size)

To Set Up GRAFIK Eye:
 1. Select a Scene.
 2. Adjust light level of each Zone.
 3. Repeat for each Scene.

To Operate GRAFIK Eye:
 Press a Scene button to recall its corresponding light levels. Press the Off button to turn all lights off.

Lutron Worldwide Locations
 U.S.A., Canada, Caribbean
 Toll Free: (800) 523-9466
 International: 1-610-202-3990
 Europe
 Freephone: 0800 282107 (U.K.)
 International: 44-171-702-0657

Hong Kong
 Tel: 2104-7733
 International: 852-2104-7733
 Singapore
 Tel: 65 487 2820
 Internet: www.lutron.com

For more setup options, refer to the literature supplied with your GRAFIK Eye, or call Lutron Electronics Co., Inc. P/N 500-8723

3100/3500 Series

	3100	3500
Manual Set-up	Yes	Yes
PC Set-up		Yes
Archive System Configuration		Yes
Copy System Configuration		Yes

Liaison™ Software

Windows®-based programming utility for 3500 systems and timeclocks

Whole-Home RF Control System

RadioRA® Interface GRAFIK RA™

GRAFIK Eye® 3000 Series

Description	Maximum Capacity	Model #	Important Information
Control Units Incandescent, Magnetic Low Voltage, Neon/Cold Cathode, Fluorescent with Tu-Wire® Dimming Ballast			Color Palette Add color suffix to model # Examples: Translucent Cover, Opaque Base: GRX-3102-T-WH Opaque Cover, Opaque Base: GRX-3102-A-WH Cover Options A Opaque (Cover and base will match) T Translucent Black (Black cover, choice of base color) Base Colors <i>Matte Finishes ships 48 hrs.</i> Matte Cover Options: A or T <i>Gloss Finishes ships 4-6 wks.</i> Gloss Cover Option: A only <i>Metal Finishes ships 4-6 wks.</i> Metal Cover Option: T only <i>Satin Finishes ships 4-6 wks.</i> Satin Cover Options: A or T See pg.1 for complete color offering and suffixes. Wallplate Depth Depth listed with each product includes wallplate and backbox. Wallplate depth is 0.35" (9mm).
2-Zone Control Units* 3100 1200W/VA GRX-3102-  3500 1200W/VA GRX-3502- 			
<i>Dimensions:</i> W: 5.56" (141mm); H: 4.56" (116mm); D: 2.25" (57mm), depth includes wallplate and backbox. Wallbox size: two-gang, 3.50" (89mm) deep.			
3-Zone Control Units* 3100 1500W/VA GRX-3103-  3500 1500W/VA GRX-3503- 			
<i>Dimensions:</i> W: 7.25" (184mm); H: 4.56" (116mm); D: 2.25" (57mm), depth includes wallplate and backbox. Wallbox size: three-gang, 3.50" (89mm) deep.			
4-Zone Control Units* 3100 2000W/VA GRX-3104-  3500 2000W/VA GRX-3504- 			
<i>Dimensions:</i> W: 8.94" (227mm); H: 4.56" (116mm); D: 2.25" (57mm), depth includes wallplate and backbox. Wallbox size: four-gang, 3.50" (89mm) deep.			
6-Zone Control Units* 3100 2000W/VA GRX-3106-  3500 2000W/VA GRX-3506- 			
<i>Dimensions:</i> W: 8.94" (227mm); H: 4.56" (116mm); D: 2.25" (57mm), depth includes wallplate and backbox. Wallbox size: four-gang, 3.50" (89mm) deep.			
* <i>Products Above:</i> Single zone capacity is 800W/6.67A per zone. Combined total of all zones should not exceed maximum capacity.			
Electronic Low Voltage Electronic low-voltage sources require interfaces.			
Fluorescent Lutron Hi-lume® line-voltage control electronic dimming ballasts require interfaces.			
Controls are 120V, 60Hz unless noted.			
For More Information: www.lutron.com/grafikeye Fax-on-Demand 1-800-523-9466			

Entire-Room Controls



To Order/Customer Service • 8am-8pm ET (US/CAN) • 1-888-LUTRON1

GRAFIK Eye® 3000 Series Architectural Style Wallstations



Product Family Features

- Sleek slim-button wallstations to fit a designer style opening for use in single or multigang applications
- For use with one or more GRAFIK Eye 3000 Series control units; provides additional control points throughout a space
- Controls are available with infrared receiver for control by infrared remote control, pg.31
- Access all 16 preset scenes stored in one or more GRAFIK Eye control units
- Master control wallstation permits control of an entire GRAFIK Eye 3000 system from one location

Layout and Installation

- Wire with low-voltage cable, pg.28
- Power up to three wallstations/control interfaces from a single 3000 series control unit; for more than three, use a GRX-12VDC
- Derating not required when ganged
- Each designer style wallstation counts one toward system maximum 16 wallstations/control interfaces

Color Palette (For latest color information, visit www.lutron.com)



* To order contact Lutron Customer Service

GRAFIK Eye® 3000 Series

	Description	Model #	Important Information
	<p>seeTouch Style Wallstations</p> <p>4-Scene Wallstation with Off and Raise/Lower and Backlit Buttons</p> <p>4-Scenes with Off, Raise/Lower and Backlit Buttons</p> <p>• Recalls preset light levels for four scenes (1-4, 5-8, 9-12, or 13-16; selected in the field) plus off</p> <p>• Fine-tuning of light levels with master raise/lower buttons</p>	<p>Ships in 48 hrs.</p> <p>Color Palette</p> <p><i>Matte Finish</i></p> <p>Add color suffix to model # Example: SG-4SN-WH</p> <p>WH White BE Beige IV Ivory GR Gray BR Brown BL Black</p>	<p>Entire-Room Controls</p>
	<p>4-Scene Wallstation with Off, Raise/Lower, and IR Receiver</p> <p>4-Scenes, Off, Raise/Lower, Infrared Receiver with Backlit Buttons</p> <p>• Recalls preset light levels for four scenes (1-4, 5-8, 9-12 or 13-16; selected in the field) plus off</p> <p>• Wireless infrared remote controls can recall scenes (determined by wallstation field settings), plus off and master raise/lower, pg.31</p> <p>• Fine-tuning of light levels with master raise/lower buttons</p>	<p>SG-4SN-□ SG-4SI-□*</p> <p>SG-4SIRN-□ SG-4SIRI-□*</p> <p><i>Satin Finish (Insert models only)</i></p> <p>Add color suffix to model # Example: SG-4SI-SW</p> <p>SW Snow BI Biscuit ES Eggshell TP Taupe MN Midnight BT Blue Mist LS Limestone ST Stone DS Desert Stone TC Terracotta OC Ochre HT Hot</p>	
	<p>4-Partition Status Wallstation</p> <p>Partition Control with Backlit Buttons</p> <p>• Provides four buttons to determine which GRAFIK Eye control unit(s) operate independently or in combination to reflect partition status for up to four moveable walls (five rooms)</p> <p>• Last button resets all control units to independent operation</p>	<p>SG-4PSN-□ SG-4PSI-□*</p> <p><i>Gloss Finish (Insert models only)</i></p> <p>Add color suffix to model # Example: SG-4SI-GWH</p> <p>GWH White GLA Light Almond</p> <p><i>Colors meet NEMA color standards where standards exist</i></p>	
	<p>4-Button Master Control Wallstation</p> <p>Master Control with Backlit Buttons</p> <p>• Each of four buttons toggles individually selected GRAFIK Eye control unit(s) between Scene 1 and off</p> <p>• Last button turns selected GRAFIK Eye control unit(s) off (can be changed in the field to turn control unit(s) on)</p> <p><i>Products Above:</i> Single-gang wallplate included with product. For replacement, metal, and multigang wallplates, contact Lutron Customer Service.</p> <p><i>Dimensions:</i> W: 2.75"(70mm); H: 4.56"(116mm); D: 1.69"(43mm), depth includes wallplate and backbox. Wallplate depth is 0.30"(7.6mm). Wallbox size: single gang</p>	<p>*Insert Models</p> <p>Use insert models with multigang wallplates.</p> <p>Controls are Class2/PELV unless noted.</p> <p>   Global Ordering</p> <p>For More Information: www.lutron.com/grafikeye Fax-on-Demand 1-800-523-9466</p>	



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Diesel generator set 4BT3.3 series engine EPA emissions



> **Specification sheet**
35 kW - 50 kW standby

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Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.

- 

This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.
- 

The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.
- 

All low voltage models are CSA certified to product class 4215-01.
- 

The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies.
- U.S. EPA** Engine certified to U.S. EPA Nonroad Source Emissions Standards, 40 CFR 89, Tier 2.

Features

- Cummins® heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.
- Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.
- Control system** - The PowerCommand® 1301 electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance. The optional PowerCommand 2100 control is UL 508 Listed and provides AmpSentry™ protection.
- Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.
- Enclosures** - Optional weather protective and sound attenuated enclosures are available.
- Fuel tanks** - Dual wall sub-base fuel tanks and in-skid day tanks are also offered.
- NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.
- Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
DGGD	35 (44)		30 (38)				D-3438	
DGHD	40 (50)		36 (45)				D-3439	
DGHE	50 (63)		45 (56)				D-3440	

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Appendix E - Backup Generator

Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 1.0%
Random voltage variation	± 1.0%
Frequency regulation	5%
Random frequency variation	± 0.5% (isochronous optional ± 0.25%)
Radio frequency emissions compliance	Meets requirements of most industrial and commercial applications

Engine specifications

Design	Turbocharged
Bore	95.0 mm (3.74 in)
Stroke	115.1 mm (4.53 in)
Displacement	3.3 L (199.0 in ³)
Cylinder block	Cast iron, in-line, 4 cylinder
Battery capacity	550 amps minimum at ambient temperature of 0 °C (32 °F)
Battery charging alternator	35 amps
Starting voltage	12 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel
Fuel filter	Single element, 10 micron filtration, spin-on fuel filter with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	One spin-on, full flow filter
Standard cooling system	40 °C (104 °F) ambient radiator

Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Direct coupled, flexible disc
Insulation system	Class H per NEMA MG1-1.65
Standard temperature rise	150 °C (302 °F) standby
Exciter type	Shunt
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

Available voltages

Three phase reconnectable				Single phase non-reconnectable	Three phase non-reconnectable	
•120/208	•120/240	•127/220	•139/240	•120/240	•220/380	•347/600
•240/416	•254/440	•277/480				

Note: Consult factory for other voltages.

Generator set options and accessories

- | | | | |
|--|--|--|--|
| <p>Engine</p> <ul style="list-style-type: none"> <input type="checkbox"/> 120/240 V, 1000 W coolant heater <input type="checkbox"/> 120/240 V, 150 W lube oil heater <input type="checkbox"/> Electronic governor <p>Fuel system</p> <ul style="list-style-type: none"> <input type="checkbox"/> 12 hour dual wall sub-base tank <input type="checkbox"/> 24 hour dual wall sub-base tank | <ul style="list-style-type: none"> <input type="checkbox"/> Single wall sub-base tank, 80 gal (303 L) <p>Alternator</p> <ul style="list-style-type: none"> <input type="checkbox"/> 105 °C (221 °F) rise alternator <input type="checkbox"/> 125 °C (257 °F) rise alternator <input type="checkbox"/> 120/240 V, 100 W anti-condensation heater <input type="checkbox"/> Extended stack (full single phase output) <input type="checkbox"/> PMG excitation <input type="checkbox"/> Single phase | <p>Exhaust system</p> <ul style="list-style-type: none"> <input type="checkbox"/> Genset mounted muffler <input type="checkbox"/> Heavy duty exhaust elbow <input type="checkbox"/> Slip on exhaust connection <p>Cooling system</p> <ul style="list-style-type: none"> <input type="checkbox"/> 50 °C (122 °F) ambient cooling <p>Generator set</p> <ul style="list-style-type: none"> <input type="checkbox"/> AC entrance box <input type="checkbox"/> Batteries | <ul style="list-style-type: none"> <input type="checkbox"/> Battery charger <input type="checkbox"/> Enclosure: aluminum, steel, weather protective or sound attenuated <input type="checkbox"/> Export box packaging <input type="checkbox"/> UL 2200 Listed <input type="checkbox"/> Main line circuit breaker <input type="checkbox"/> Spring isolators <input type="checkbox"/> 2 year standby warranty <input type="checkbox"/> 2 year prime power warranty <input type="checkbox"/> 5 year basic power warranty |
|--|--|--|--|

Note: Some options may not be available on all models - consult factory for availability.

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Transfer switch OTEC open or delayed transition



> **Specification sheet**
40 - 1000 Amp

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Description

OTEC transfer switches are designed for operation and switching of electrical loads between primary power and standby generator sets. They are suitable for use in emergency, legally required, and optional standby applications. The switches monitor both power sources, signal generator set startup, automatically transfer power, and return the load to the primary power source once a stable utility is available.



All switches are UL 1008 Listed with UL Type Rated cabinets and UL Listed CU-AL terminals.



All switches are certified to CSA 282 Emergency Electrical Power Supply for Buildings, up to 600 VAC.



Equipment shall be suitable for use in systems compliant to 700, 701 and 702.



All switches comply with NFPA 70, 99 and 110.



All switches comply with NEMA ICS 10.



All switches comply with IEEE 446 Recommended Practice for Emergency and Standby Power Systems.



This transfer switch is designed and manufactured in facilities certified to ISO9001.

Features

PowerCommand® control - A standard, fully featured microprocessor-based control. Software-enabled features, settings, and adjustments are available for ease of setup and accuracy.

Advanced transfer switch mechanism - Unique bi-directional linear actuator provides virtually friction-free, constant force, straight-line transfer switch action during automatic operation.

Manual operation - Manual operating handles, shielded termination, and over-center type contact mechanisms allow effective, manual operation, under de-energized conditions.

Positive interlocking - Mechanical and electrical interlocking prevent source-to-source connection through the power or control wiring.

Main contacts - Heavy-duty silver alloy contacts with separate arcing surfaces and multi-leaf arc chutes are rated for total system transfer including overload interruption.

Easy service/access - Plug connections, door-mounted controls, ample access space, and compatible terminal markings. The control is field programmable.

Product lines, accessories and services - Cummins Power Generation offers a wide range of accessories and services to suit your requirements.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

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S-1464m (4/08)

Appendix E - Backup Generator

Transfer switch mechanism

- A bi-directional linear motor actuator powers OTEC Transfer Switches. This design provides virtually friction-free, constant force, straight-line transfer switch action with no complex gears or linkages.
- Independent break-before-make action is used for both 3-pole and 4-pole/switched neutral switches. On 3-pole/switched neutral switches, this action also prevents the objectionable ground currents and nuisance ground fault tripping that can result from overlapping designs.
- A mechanical interlock prevents simultaneous closing of normal and emergency contacts.
- Electrical interlocks prevent simultaneous closing signals to normal and emergency contacts and interconnection of normal and emergency sources through the control wiring.
- Long-life, high pressure, silver alloy contacts resist burning and pitting. Separate arcing surfaces further protect the main contacts. Contacts are mechanically held in both normal and emergency positions for reliable, quiet operation.
- Superior arc interruption is accomplished through multiple leaf arc chutes that cool and quench the arcs. Barriers separate the phases and prevent inter-phase flashover

Specifications

Voltage rating	Transfer switches rated from 40 A through 1000 A are rated up to 600 VAC, 50 or 60 Hz.
Arc interruption	Multiple leaf arc chutes cool and quench the arcs. Barriers prevent interphase flashover.
Neutral bar	A full current-rated neutral bar with lugs is standard on enclosed 3-pole transfer switches.
Auxiliary contacts	Two contacts (one for each source) are provided for customer use. Wired to terminal block for easy access. Rated at 10A continuous and 250 VAC maximum.
Operating temperature	-22 °F (-30 °C) to 140 °F (60 °C)
Storage temperature	-40 °F (-40 °C) to 140 °F (60 °C)
Humidity	Up to 95% relative, non-condensing
Altitude	Up to 10,000 ft (3,000 m) without derating
Total transfer time (source-to-source)	Will not exceed 6 cycles at 60 Hz with normal voltage applied to the actuator and without delayed transition enabled.
Manual operation handles	Transfer switches are equipped with permanently attached operating handles and quick-break, quick-make contact mechanisms suitable for manual operation under de-energized conditions.

Open transition - The OTEC automatic transfer switch, equipped with In-phase monitor, determines when to transfer the load from one source to another. The switch contacts operate in a break-before-make sequence. The Open Transfer OTEC is field-configurable for delayed transition below 1000 amps.

Delayed (programmed) transition - The OTEC is also available as a programmed (delayed) transition transfer switch. The delayed transition OTEC completely disconnects the load from both sources for an adjustable period of time to allow regenerative voltage to decay to a safe level prior to connecting to the new source. By allowing motor fields to decay, nuisance tripping breakers and load damage are prevented. Delayed transition transfer is recommended by NEMA MG-1.

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PowerCommand® microprocessor control

- Simple, easy-to-use control provides transfer switch information and operator controls
- LED lamps for source availability and source connected indication, exercise mode, and test mode. LED status lamps also provided for control set-up and configuration.
- Control pushbuttons to initiate test, override time delays, and set exercise time.
- Field-configurable for in-phase or delayed (programmed) transition.
- Integral exerciser clock
- Control is prototype-tested to withstand voltage surges per EN 60947-6-1.
- Gold-flashed generator start contacts



Control functions

Voltage sensing: All phases on the normal source and single phase on generator source. Normal Source Pickup: adjustable 90-95%, Dropout: adjustable 70-90% of nominal voltage; Generator Source Pickup: 90%, dropout: 75% of nominal voltage.

Frequency sensing: Generator Source Pickup: 90% of nominal frequency; Dropout: 75% of nominal frequency.

Operating modes: Open transition with programmed transition (adjustable 0-10 seconds); Open transition with in-phase monitor and delayed transition backup; Exercise mode; and Test mode.

In-phase: Configurable for initiation of transfer functions when sources are in phase, and including ability to enable a programmed transition backup to the function so that if sources are not in-phase within 120 seconds the system will retransfer with programmed transition function.

Exerciser clock: Switch is furnished with an integral engine exerciser configurable for operation on a 7, 14, 21, or 28-day cycle with a fixed exercise period duration of 20 minutes. A 12-hr exerciser time offset allows for the convenient setting of exercise time without the need to activate the timer at the exact time that you need to schedule the generator exercise for. Software selectable capability allows for the exercising of the generator with or without load.

Time-delay functions

Engine start: Prevents nuisance genset starts due to momentary power system variation or loss. Adjustable: 0-10 seconds; default: 3 seconds.

Transfer normal to emergency: Allows genset to stabilize before application of load. Prevents power interruption if normal source variation or loss is momentary. Allows staggered transfer of loads in multiple transfer switch systems. Adjustable 0-300 seconds, default 5 seconds.

Retransfer emergency to normal: Allows the utility to stabilize before retransfer of load. Prevents needless power interruption if return of normal source is momentary. Allows staggered transfer of loads in multiple transfer switch systems. Adjustable 0-30 minutes, default 10 minutes.

Genset stop: Maintains availability of the genset for immediate reconnection in the event that the normal source fails shortly after transfer. Allows gradual genset cool down by running unloaded. Adjustable 0-30 minutes, default 10 minutes.

Delayed (programmed) transition: Controls the speed of operation of the transfer switch power contacts to allow load generated voltages from inductive devices to decay prior to connecting a live source. Adjustable 0-10 seconds, default 0 seconds.

Elevator signal: Provides a relay output contact for the elevator signal relay (load disconnect). The signal can also be configured to provide a post transfer delay of the same duration. Adjustable: 0-300 seconds (requires optional elevator signal relay for use).

Options

Elevator signal relay: Provides a relay output contact for the signal relay function

Programmable exerciser clock: Provides a fully-programmable 7-day clock to provide greater flexibility in scheduling exercise periods than standard integral exerciser. Peaking function feature allows for generator operation during periods of high utility rates.

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Appendix E - Backup Generator

UL withstand and closing ratings

The transfer switches listed below must be protected by circuit breakers or fuses. Referenced drawings include detailed listings of specific breakers or fuse types that must be used with the respective transfer switches. Consult with your distributor/dealer to obtain the necessary drawings. Withstand and Closing Ratings (WCR) are stated in symmetrical RMS amperes.

Transfer switch ampere	MCCB protection			Current limited breaker protection		
	WCR @ volts max with specific manufacturers MCCBs	Max MCCB rating	Drawing reference	With specific current limiting breakers (CLB)	Max CLB rating	Drawing reference
40, 70, 125 3-pole	14,000 @ 600	225 A	098-6885	200,000 @ 600	225 A	098-6918
40, 70, 125 4-pole	30,000 @ 600	225 A	098-6885	200,000 @ 600	225 A	098-6918
150, 225, 260	30,000 @ 600	400 A	098-6886	200,000 @ 600	400 A	098-6919
300, 400, 600	65,000 @ 600	1200 A	098-6887	200,000 @ 600	1200 A	098-6920
800, 1000	65,000 @ 480	1400 A	098-6888	200,000 @ 600	1400 A	098-6921
	50,000 @ 600					

Fuse protection

Transfer switch ampere	WCR @ volts max. with current limiting fuses	Max fuse, size and type	Drawing reference
40, 70, 125 3- and 4-pole	200,000 @ 600	200 A Class, J, RK1, RK5, T	098-6885
150, 225, 260	200,000 @ 600	1200 A Class L or T, or 600 A class J, RK1, RK5	098-6886
300, 400, 600	200,000 @ 600	1200 A Class L or T, or 600 A Class, J, RK1, RK5	098-6887
800, 1000	200,000 @ 600	2000 A Class L or 1200 A class T or 600 A class J, RK1, RK5	098-6888

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S-1464m (4/08)



Appendix E - Backup Generator

Model: DGHD
Frequency: 60
Fuel type: Diesel
KW rating: 40 standby
36 prime
Emissions level: EPA Nonroad Tier 2

➤ Generator set data sheet



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Exhaust emission data sheet:	EDS-1079
EPA Tier 1 exhaust emission compliance sheet:	EPA-1113
Sound performance data sheet:	MSP-192
Cooling performance data sheet:	MCP-116
Prototype test summary data sheet:	PTS-151
Standard set-mounted radiator cooling outline:	0500-3426
Optional set-mounted radiator cooling outline:	
Optional heat exchanger cooling outline:	
Optional remote radiator cooling outline:	

Fuel consumption	Standby				Prime				Continuous
	kW (kVA)				kW (kVA)				kW (kVA)
Ratings	40 (50)				36 (45)				
Load	1/4	1/2	3/4	Full	1/4	1/2	3/4	Full	Full
US gph	0.96	1.68	2.4	3.3	0.92	1.5	2.2	2.9	
L/hr	4	6	9	13	3	6	8	11	

Engine	Standby rating	Prime rating	Continuous rating
Engine manufacturer	Cummins Inc.		
Engine model	4BT3.3-G6, NR2		
Configuration	Cast iron, in-line 4 cylinder		
Aspiration	Turbocharged		
Gross engine power output, kWm (bhp)	61 (82.0)	53 (72.0)	
BMEP at rated load, kPa (psi)	1250 (181)		
Bore, mm (in)	95.0 (3.74)		
Stroke, mm (in)	115.1 (4.53)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	6.9 (1359.0)		
Compression ratio	18:1		
Lube oil capacity, L (qt)	7.9 (8.4)		
Overspeed limit, rpm	2100 ± 50		
Regenerative power, kW	8.50		

Fuel flow		
Fuel flow at rated load, L/hr (US gph)	39.8 (10.5)	
Maximum inlet restriction, mm Hg (in Hg)	73.7 (2.9)	
Maximum return restriction, mm Hg (in Hg)	381.0 (15.0)	

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Appendix E - Backup Generator

Air	Standby rating	Prime rating	Continuous rating
Combustion air, m ³ /min (scfm)	4.0 (142)	3.7 (131)	
Maximum air cleaner restriction w/clean filter, kPa (in H ₂ O)	3.0 (12.0)		
Alternator cooling air, m ³ /min (scfm)	18.0 (635.0)		

Exhaust			
Exhaust flow at rated load, m ³ /min (cfm)	12.9 (456)	11.8 (417)	
Exhaust temperature, °C (°F)	590 (1094)	551 (1024)	
Maximum back pressure, kPa (in H ₂ O)	10.2 (41.0)		

Standard set-mounted radiator cooling			
Ambient design, °C (°F)	54 (129)	55 (131)	
Fan load, kW (HP)	1.3 (1.7)		
Coolant capacity (with radiator), L (US gal)	15.1 (4.0)		
Cooling system air flow, m ³ /min (scfm)	85 (3000)		
Total heat rejection, MJ/min (Btu/min)	2.3 (2177)		
Maximum cooling air flow static restriction, kPa (in H ₂ O)	0.12 (0.5)		

Optional set-mounted radiator cooling			
Ambient design, °C (°F)			
Fan load, kW (HP)			
Coolant capacity (with radiator), L (US gal)			
Cooling system air flow, m ³ /min (scfm)			
Total heat rejection, MJ/min (Btu/min)			
Maximum cooling air flow static restriction, kPa (in H ₂ O)			

Optional heat exchanger cooling			
Set coolant capacity, L (US gal)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, after-cooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated to room, MJ/min (Btu/min)			
Maximum raw water pressure, jacket water circuit, kPa (psi)			
Maximum raw water pressure, aftercooler circuit, kPa (psi)			
Maximum raw water pressure, fuel circuit, kPa (psi)			
Maximum raw water flow, jacket water circuit, L/min (US gal/min)			
Maximum raw water flow, aftercooler circuit, L/min (US gal/min)			
Maximum raw water flow, fuel circuit, L/min (US gal/min)			
Minimum raw water flow @ 27 °C (80 °F) Inlet temp, jacket water circuit, L/min (US gal/min)			
Minimum raw water flow @ 27 °C (80 °F) Inlet temp, after-cooler circuit, L/min (US gal/min)			
Minimum raw water flow @ 27 °C (80 °F) Inlet temp, fuel circuit, L/min (US gal/min)			
Raw water delta P @ min flow, jacket water circuit, kPa (psi)			
Raw water delta P @ min flow, after-cooler circuit, kPa (psi)			
Raw water delta P @ min flow, fuel circuit, kPa (psi)			
Maximum jacket water outlet temp, °C (°F)			
Maximum after-cooler inlet temp, °C (°F)			
Maximum after-cooler inlet temp @ 25 °C (77 °F) ambient, °C (°F)			

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Appendix E - Backup Generator

Optional remote radiator cooling¹

Set coolant capacity, L (US gal)	
Max flow rate @ max friction head, jacket water circuit, L/min (US gal/min)	
Heat rejected, jacket water circuit, MJ/min (Btu/min)	
Total heat radiated to room, MJ/min (Btu/min)	
Maximum friction head, jacket water circuit, kPa (psi)	
Maximum static head, jacket water circuit, m (ft)	
Maximum jacket water outlet temp, °C (°F)	

Weights²

Unit dry weight kgs (lbs)	
Unit wet weight kgs (lbs)	711 (1568)

Notes:

¹ For non-standard remote installations contact your local Cummins Power Generation representative.

² Weights represent a set with standard features. See outline drawing for weights of other configurations.

Derating factors

Standby	Engine power available up to 3574 m (11,724 ft). Derate at 0.9% per 100 m (328 ft), above 3574 m (11,724 ft).
Prime	Engine power available up to 3574 m (11,724 ft). Derate at 0.9% per 100 m (328 ft), above 3574 m (11,724 ft).
Continuous	

Ratings definitions

Emergency standby power (ESP):	Limited-time running power (LTP):	Prime power (PRP):	Base load (continuous) power (COP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.	Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.	Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.

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Appendix E - Backup Generator

Alternator data

Three phase table¹		105 °C	105 °C	105 °C	105 °C	125 °C	125 °C	125 °C	125 °C	150 °C	150 °C	150 °C
Feature code		B418	B415	B268	B304	B417	B414	B267	B303	B416	B413	B419
Alternator data sheet number		202	202	204	202	201	201	203	201	201	201	201
Voltage ranges		110/190 thru 120/208 thru 220/380 thru 240/416	120/208 thru 139/240 thru 240/416 thru 277/480	120/208 thru 139/240 thru 240/416 thru 277/480	347/600	110/190 thru 120/208 thru 220/380 thru 240/416	120/208 thru 139/240 thru 240/416 thru 277/480	120/208 thru 139/240 thru 240/416 thru 277/480	347/600	110/190 thru 120/208 thru 220/380 thru 240/416	120/208 thru 139/240 thru 240/416 thru 277/480	347/600
Surge kW		53.1	52.8	54.4	53.4	52	51.7	53.5	52.5	52	51.7	52.5
Motor starting kVA (at 90% sustained voltage)	Shunt	163	163	231	163	131	131	188	131	131	131	131
	PMG	191	191	272	191	155	155	221	155	155	155	155
Full load current amps at standby rating		<u>120/208</u> 139	<u>127/220</u> 131	<u>139/240</u> 120	<u>220/380</u> 76	<u>240/416</u> 60	<u>277/480</u> 60	<u>347/600</u> 48				

Single phase table		105 °C	105 °C	105 °C	105 °C	125 °C	125 °C	125 °C	125 °C			
Feature code		B418	B415	B274	B268	B417	B414	B273	B267			
Alternator data sheet number		202	202	203	204	201	201	202	203			
Voltage ranges		120/240 ²	120/240 ²	120/240 ²	120/240 ²	120/240 ²	120/240 ²	120/240 ²	120/240 ²			
Surge kW		50.1	50.1	53	52.8	49.5	49.5	52.2	51.4			
Motor starting kVA (at 90% sustained voltage)	Shunt	95	95	113	130	72	72	95	113			
	PMG	112	112	133	153	85	85	112	133			
Full load current amps at standby rating		<u>120/240²</u> 111	<u>120/240²</u> 167									

Notes:

- ¹ Single phase power can be taken from a three phase generator set at up to 2/3 set rated 3-phase kW at 1.0 power factor. Also see Note 3 below.
- ² The broad range alternators can supply single phase output up to 2/3 set rated 3-phase kW at 1.0 power factor.
- ³ The extended stack (full single phase output) and 4 lead alternators can supply single phase output up to full set rated 3-phase kW at 1.0 power factor.

Formulas for calculating full load currents:

Three phase output

$$\frac{\text{kW} \times 1000}{\text{Voltage} \times 1.73 \times 0.8}$$

Single phase output

$$\frac{\text{kW} \times \text{SinglePhaseFactor} \times 1000}{\text{Voltage}}$$

Cummins Power Generation

1400 73rd Avenue N.E.
 Minneapolis, MN 55432 USA
 Phone: 763 574 5000
 Fax: 763 574 5298

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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Enclosures and tanks 230-500 kW



> Specification sheet

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Enclosure features

- 14-gauge steel construction (panels)
- 12-gauge steel construction (posts)
- Stainless steel hardware
- Double E-coat green paint
- Package Listed to UL 2200
- Designed to satisfy all requirements of National Electrical Code installations
- Fuel and electrical stub-up area within enclosure perimeter
- Fixed louvers
- Cambered roof prevents water accumulation
- Three recessed, lockable doors per side
- Retainers hold doors open for easy access
- Enclosed exhaust silencer ensures safety and protects against rust
- Rain collar and rain cap
- Exterior oil and coolant drains with interior valves for ease of service
- Rodent barriers on inlet and outlet
- Non-hydroscopic sound attenuating material
- Side mounted controls and circuit breakers
- Easy access lifting points for spreader bars
- Dual vibration isolation system
- Enclosure mounts to fuel tank or lifting base
- Factory pre-assembled package
- Enclosures are designed for outdoor use only

Options

- Three levels of sound attenuation
- Motorized louvers
- Enclosed motorized louvers to protect from ice and snow accumulation (available on air inlet for all models and on air outlet on Level II enclosures only)
- Externally mounted emergency stop button for operator safety
- Horizontal air discharge (Level II only)
- Aluminum construction
- Wind rated to 150 mph (standard on aluminum enclosures, optional on steel)
- Neutral sandstone paint color
- Factory mounted battery charger
- External 120 VAC service outlet
- Rain hoods for air inlet
- Lifting base in lieu of a sub-base tank
- Pre-wired AC distribution package
 - 100 amp, 120/240 volt, single phase load center
 - Spare breaker positions and capacity for future upgrades
 - GFCI protected internal 120 volt AC service receptacle
 - GFCI protected weather proof external 120 volt service receptacle
 - All factory installed AC powered features pre-wired into load center

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AC-171a (707) Page 1 of 4

Appendix F - Photovoltaic Panels



SX 3200

200 watt photovoltaic module

High-efficiency photovoltaic module using silicon nitride multicrystalline silicon cells

Performance

Rated power (P_{max})	200W
Power tolerance	± 9%
Nominal voltage	16V
Limited Warranty ¹	25 years

Configuration

B	Bronze frame with output cables and polarized Multicontact (MC) connectors
----------	--

Electrical Characteristics²

	SX 3200	SX 3195
Maximum power (P_{max}) ³	200W	195W
Voltage at P_{max} (V_{mp})	24.5V	24.4
Current at P_{max} (I_{mp})	8.16A	7.96A
Warranted minimum P_{max}	182.0W	177.5W
Short-circuit current (I_{sc})	8.7A	8.6A
Open-circuit voltage (V_{oc})	30.8V	30.7V
Temperature coefficient of I_{sc}	(0.065 ± 0.015)%/°C	
Temperature coefficient of V_{oc}	-(111 ± 10)mV/°C	
Temperature coefficient of power	-(0.5 ± 0.05)%/°C	
NOCT (Air 20°C; Sun 0.8kW/m ² ; wind 1m/s)	47 ± 2°C	
Maximum series fuse rating	15A	
Maximum system voltage	600V (U.S. NEC rating)	



Mechanical Characteristics

Dimensions	Length: 1680mm (66.14") Width: 837mm (32.95") Depth: 50mm (1.97")
Weight	15.4 kg (33.95 pounds)
Solar Cells	50 cells (156mm x 156mm) in a 5x10 matrix connected in series
Output Cables	RHW-2 AWG# 12 (4mm ²), cable with polarized weatherproof DC rated Multicontact connectors; asymmetrical lengths - 1250mm (-) and 800mm (+)
Diodes	IntegraBus™ technology includes Schottky by-pass diodes integrated into the printed circuit board bus
Construction	Front: High-transmission 3mm (1/8th in) tempered glass; Back: White or BlackTedlar; Encapsulant: EVA
Frame	B Anodized aluminium alloy type 6063T6 Universal frame; Color: bronze

1. Module warranty: 25-year limited warranty of 80% power output; 12-year limited warranty of 90% power output; 5-year limited warranty of materials and workmanship. See your local representative for full terms of these warranties.

2. This data represents the performance of typical SX 3200 products, and is based on measurements made in accordance with ASTM E1036 corrected to SRC (STC.)

3. During the stabilization process that occurs during the first few months of deployment, module power may decrease by up to 1% from typical P_{max} .

Appendix F - Photovoltaic Panels

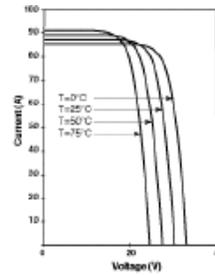
Quality and Safety

ESTI	Module power measurements calibrated to World Radiometric Reference through ESTI (European Solar Test Installation at Ispra, Italy)
	Listed by Underwriter's Laboratories for electrical and fire safety (Class C fire rating)

Qualification Test Parameters

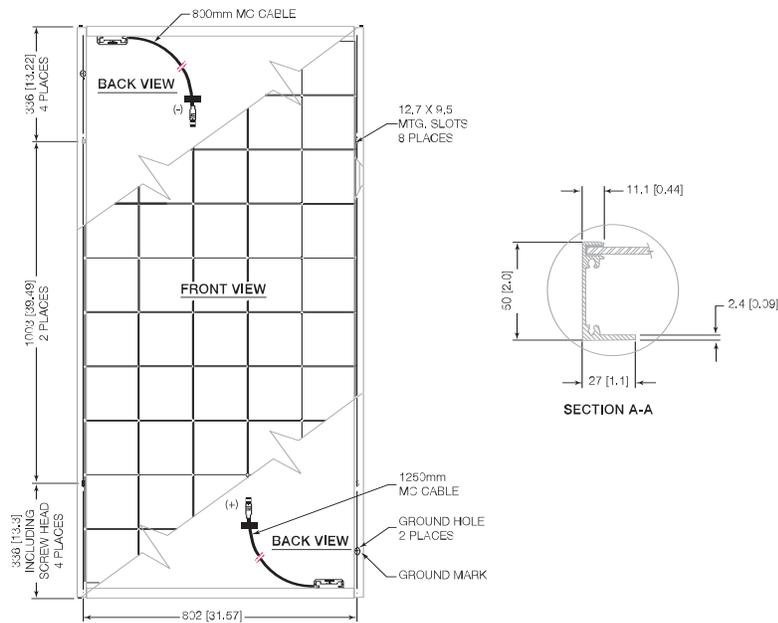
Temperature cycling range	-40°C to +85°C (-40°F to 185°F)
Humidity freeze, damp heat	85% RH
Static load front and back (e.g. wind)	2,400 pa (50psf)
Front loading (e.g. snow)	5,400 pa (113psf)
Hailstone impact	25mm Ø (1 inch) at 23 m/s (52mph)

SX 3200 I-V Curves



Module Diagram

Dimensions in brackets are in inches. Un-bracketed dimensions are in millimeters. Overall tolerances ±3mm (1/8").



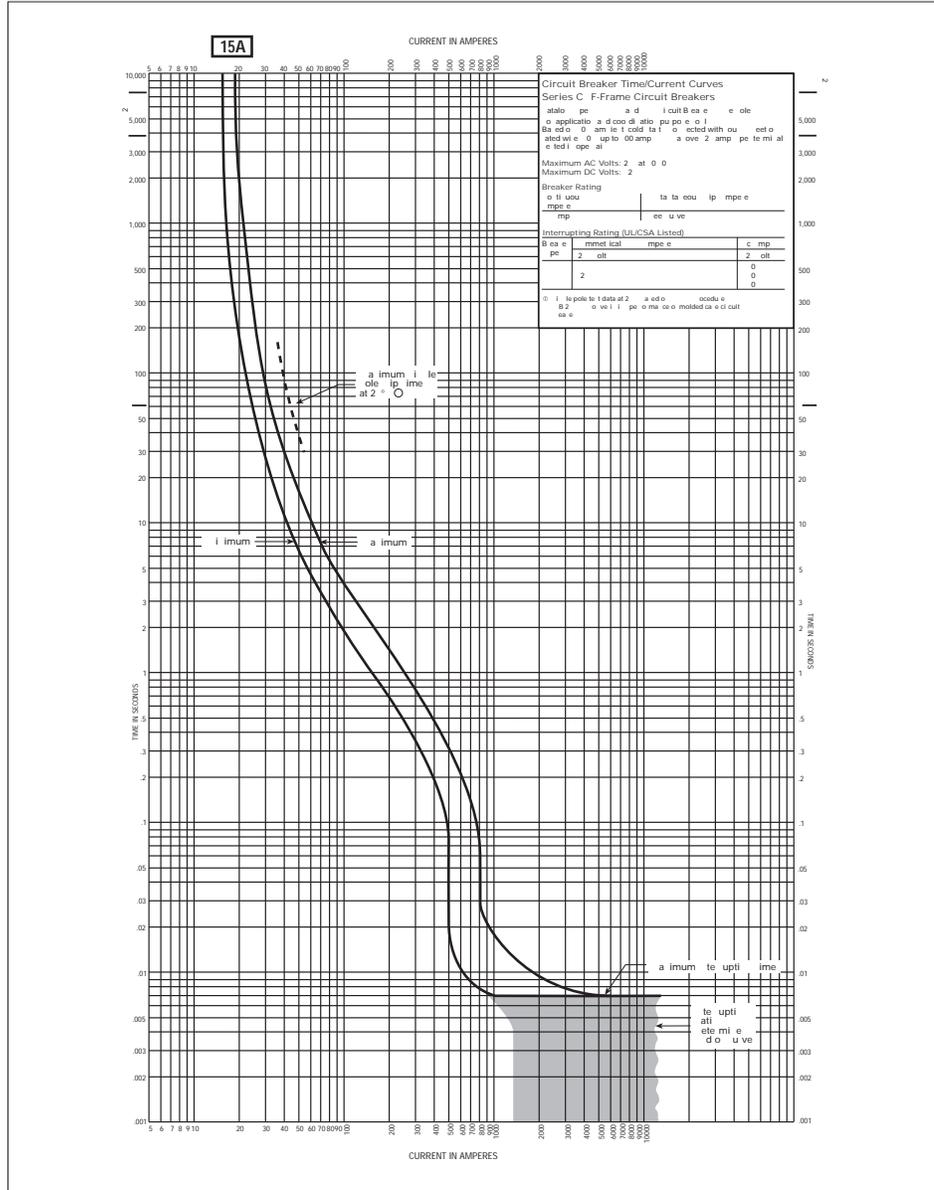
Included with each module: self-tapping grounding screw, instruction sheet and warranty documents.

Note: This publication summarizes product warranty and specifications, which are subject to change without notice. Additional information may be found on our web site: www.bpsolar.us



Appendix G - Time Current Graphs

AB DE-ION Circuit Breakers



Appendix G - Time Current Graphs

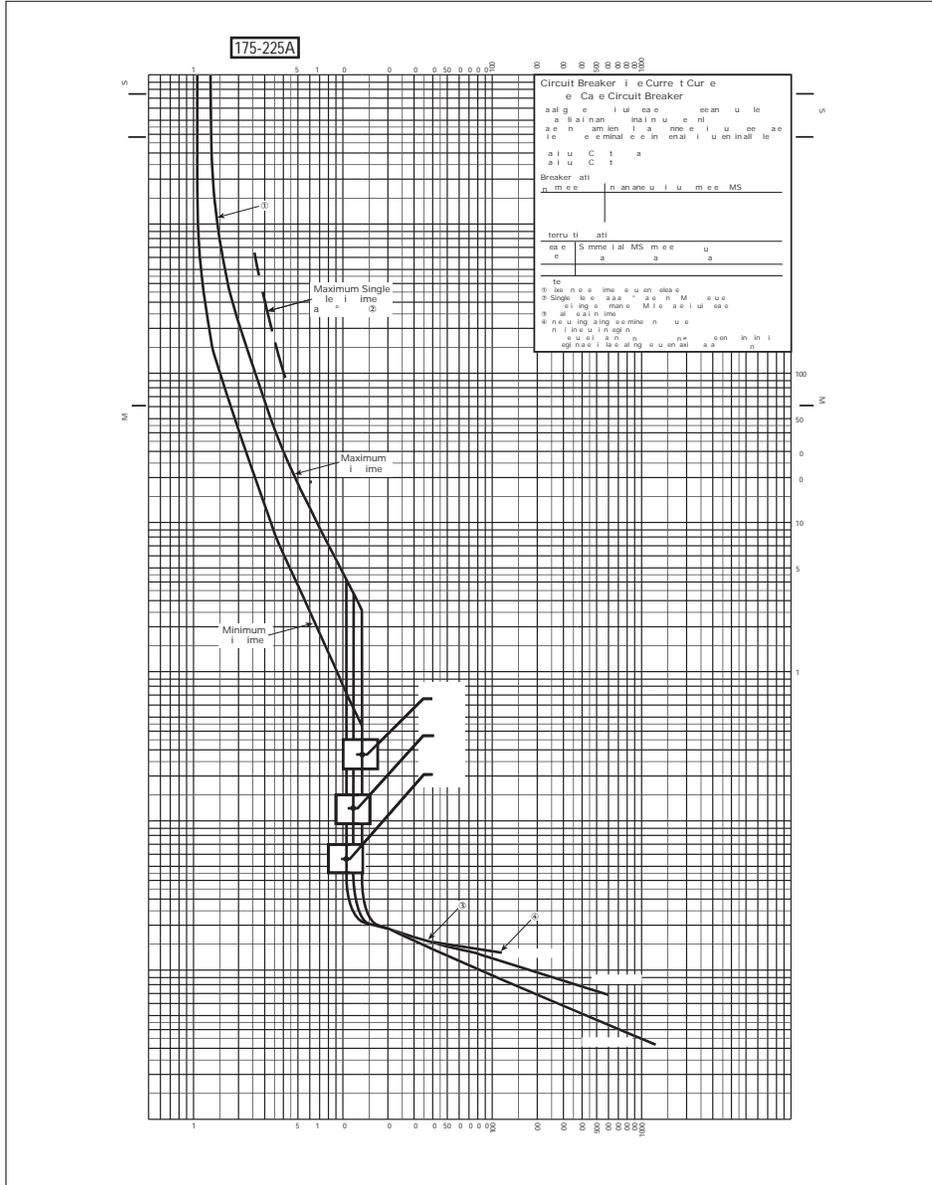
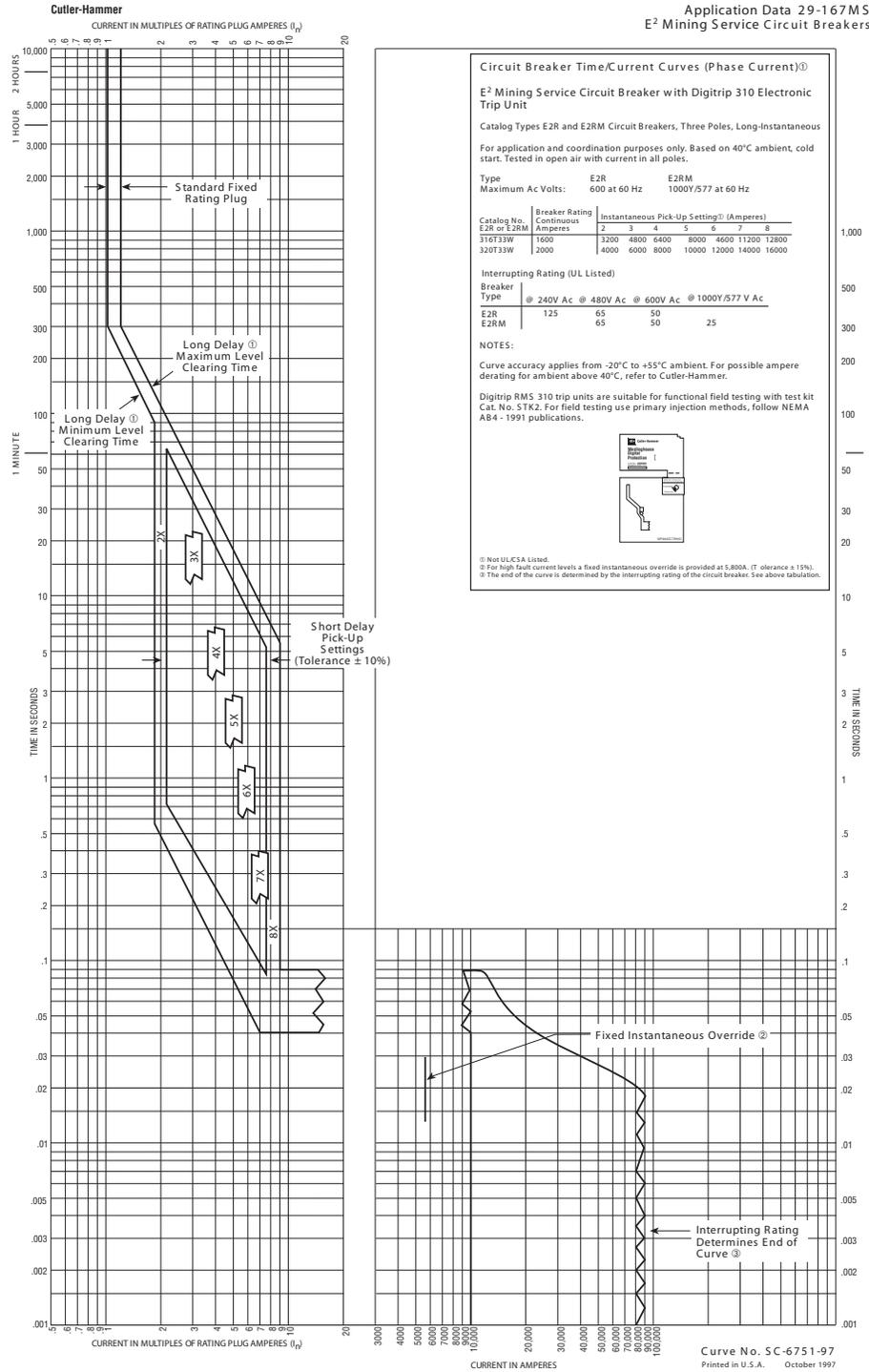


FIGURE 51. TYPE FDC 175 - 225 AMPERES — CURVE NO. SC-6971-98

Appendix G - Time Current Graphs



ZeeWeed 500 Reinforced Ultrafiltration Membranes

http://www.gewater.com/products/equipment/mf_uf_mbr/zeeweeds_500.jsp

GE Water & Process Technologies

ZeeWeed 500 Ultrafiltration Membrane

The Equipment

A full-scale ZeeWeed treatment facility is comprised of a given number of modular components: modules, cassettes, and trains.

A module is the basic building block and the heart of a ZeeWeed system. Each module contains thousands of horizontally strung membrane fibers that have millions of microscopic pores in each strand. Water is filtered by applying a slight vacuum to the end of each fiber which draws the water through the tiny pores and into the fibers themselves. The pores form a physical barrier that allows clean water to pass through while blocking unwanted material such as suspended solids, bacteria, pathogens and certain viruses.

Modules are joined together to form a cassette, which is the smallest operable unit of the filtration system. Each cassette can have a variety of module configurations depending on the amount of water that the cassette is required to treat.



Appendix F - Photovoltaic Panels

Treatment Process

Feed water flows into the membrane tanks and treated water is drawn through the membranes during Production by applying a vacuum to the inside of the membrane fibers. The water removed by permeation is replaced with feed water to maintain a constant level in the tank.

The particles that are rejected by the membrane pores remain in the process tank and are periodically removed by a process called a Backwash (BW). During a backwash, filtered water reversed through the membrane fiber to dislodge any particles that may be physically lodged in the membrane fiber. Simultaneously, aeration scours any solids that are attached on the surface of the fibers.

To prevent fouling of the ZeeWeed membranes operators are required to perform regular maintenance cleans (MC). Maintenance cleaning begins by draining the membrane tank and soaking the membranes in a cleaning solution for several minutes. The solution is then drained and chemical residues are flushed from the membranes before the system resumes normal operation.

Coupling ZeeWeed to Upstream Processes

ZeeWeed membrane systems can remove particles that are larger than the pores on the membrane fiber. Contaminants that exist in dissolved form, or are smaller than the pore size, can also be removed by the membranes if they are first transformed into insoluble species or larger particles. Treatment processes commonly coupled to ZeeWeed to accomplish such conversions include enhanced coagulation and oxidation.

Typical Applications

Membrane Bioreactor (MBR)
Tertiary Filtration
Removal of turbidity, bacteria, viruses and cysts
Removal of iron and manganese
Removal of organics, color and THM precursors
Treatment of filter backwash
Retrofit of conventional multi-media filters
Pretreatment for reverse osmosis
Emergency response systems
Mobile systems

Treatment Results

Potable/Process Water	
Turbidity	< 0.05 NTU
Bacteria	> 4 log removal
<i>Giardia</i> Cysts	> 4 log removal
<i>Cryptosporidium</i> Oocysts	> 4 log removal
Virus Rejection	> 2.5 log
Total Suspended Solids	< 1 mg/L
Total Organic Carbon	50-90% removal*
Color	< 5 PCU
Iron	< 0.05 mg/L
Manganese	< 0.02 mg/L
SDI	< 1
Wastewater Effluent (As part of a Membrane Bioreactor process)	

Appendix F - Photovoltaic Panels

TP	< 0.05 mg/L
Turbidity	< 0.2 NTU
Fecal Coliform	< 10 CFU/100 mL
Transmissivity	> 75%

* with coagulant addition

** with appropriate design and/or chemical addition

The advantages of ZeeWeed low-pressure membranes include:

Reduced lifecycle costs and extended membrane life;
 Simplified design and operation;
 Smaller footprints with reduced land acquisition costs;
 Outside-in flow path provides a more robust system;
 Consistent performance through virtually any change in raw water quality.

ZeeWeed 500 Series

Reinforced structure ensures long life
 Highest solids tolerance of any hollow fiber membrane
 Works through virtually any raw water quality change or upset
 Does not require preclarification

Benefits to You

The advantages of ZeeWeed low-pressure membranes include:

Reduced lifecycle costs and extended membrane life;
 Simplified design and operation;
 Smaller footprints with reduced land acquisition costs;
 Outside-in flow path provides a more robust system;
 Consistent performance through virtually any change in raw water quality.

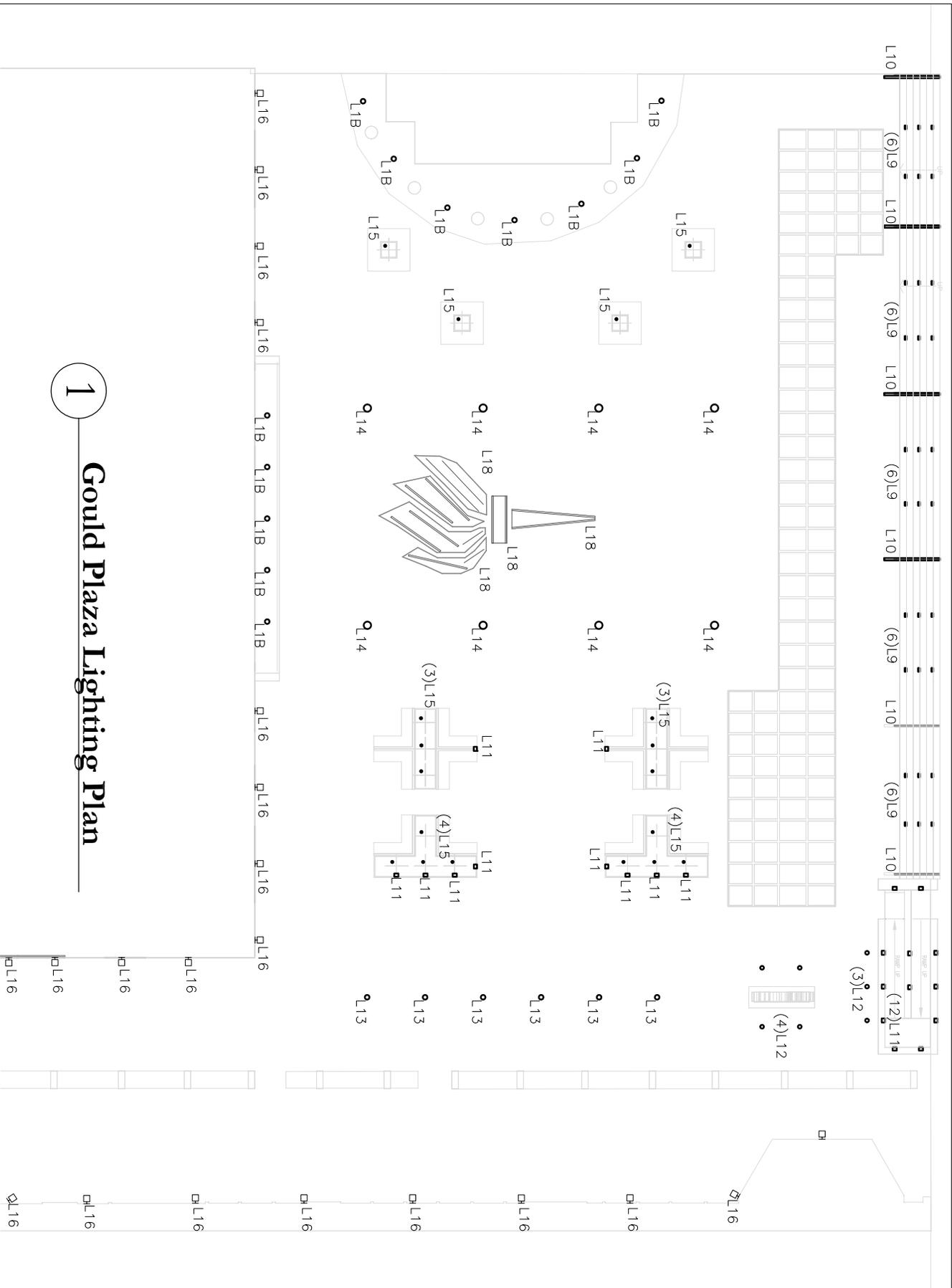
ZeeWeed 500 Series

Reinforced structure ensures long life
 Highest solids tolerance of any hollow fiber membrane
 Works through virtually any raw water quality change or upset
 Does not require preclarification

CONTACT US
Contact us to learn more about what we can do for you.

L101 - Gould Plaza Lighting Plan
L201 - Tisch Lobby Lighting Floor Plan
L202 - Tisch Lobby Lighting Reflected Ceiling Plan
L301 - Classroom Lighting Reflected Ceiling Plan
L401 - MBA Student Lounge Reflected Ceiling Plan

E101 - Gould Plaza Electrical Plan
E201 - Tisch Lobby Electrical Plan
E301 - Classroom Electrical Plan
E401 - MBA Student Lounge Electrical Plan



1

Gould Plaza Lighting Plan

**New York University
Concourse Project**

New York City, New York

Pennsylvania State University
Architectural Engineering
AE 481W/882 - Senior Thesis Project

Student: Kevin C. Hsia
Advisors: R.Mistrick & T.Dannerth

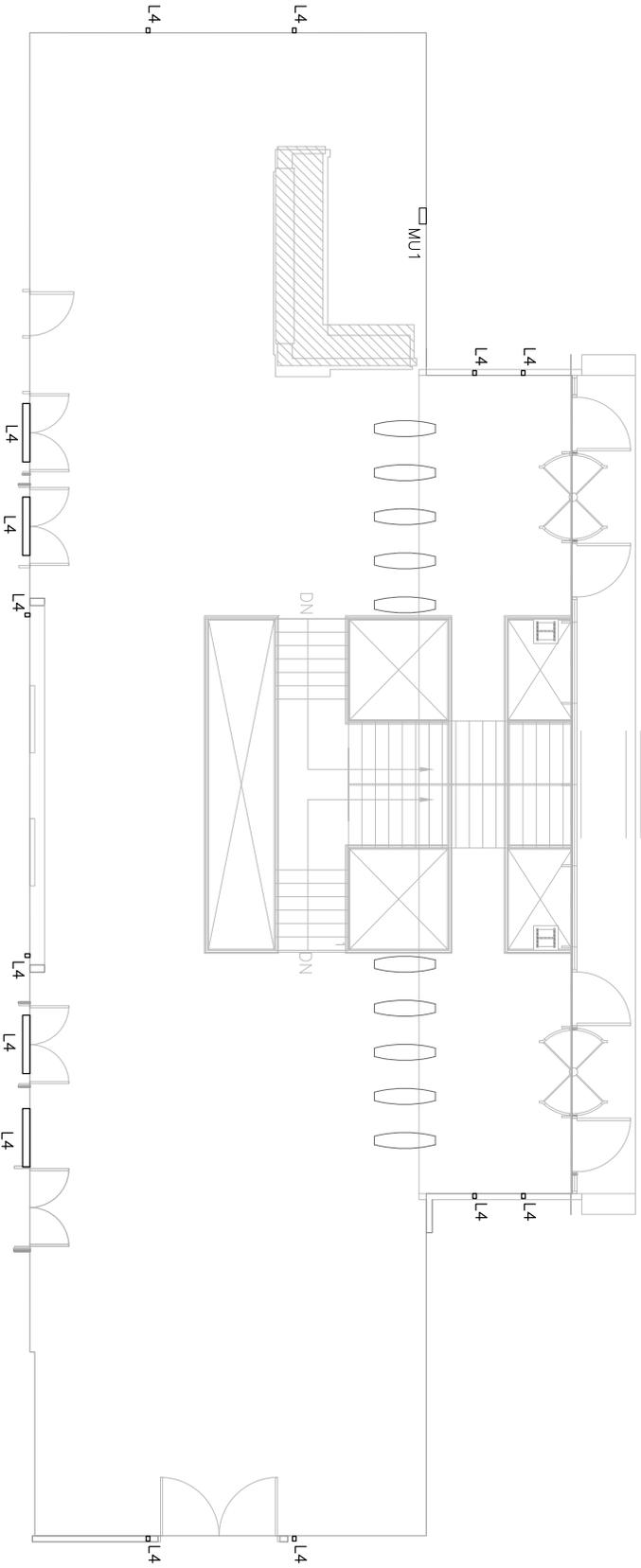
Date: April 7, 2009

Scale: 1/16" = 1'-0"

Drawing Title:
**Gould Plaza
Lighting Plan**

Sheet:

L101



1 Tisch Lobby Lighting Floor Plan

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New York City, New York

Pennsylvania State University
Architectural Engineering
AE 481W/882 - Senior Thesis Project

Student: Kevin C. Hsia
Advisors: R.Mistrick & T.Dannerth

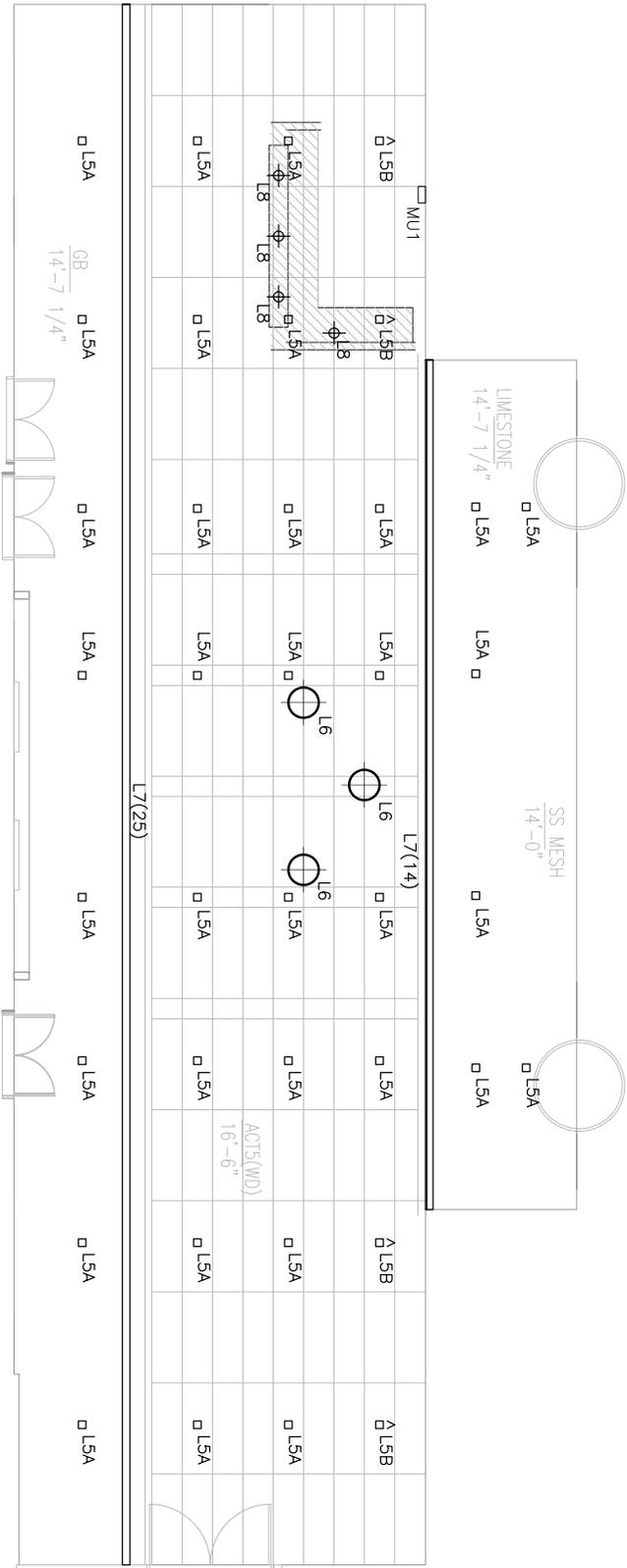
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Tisch Lobby
Lighting Floor Plan

Sheet:

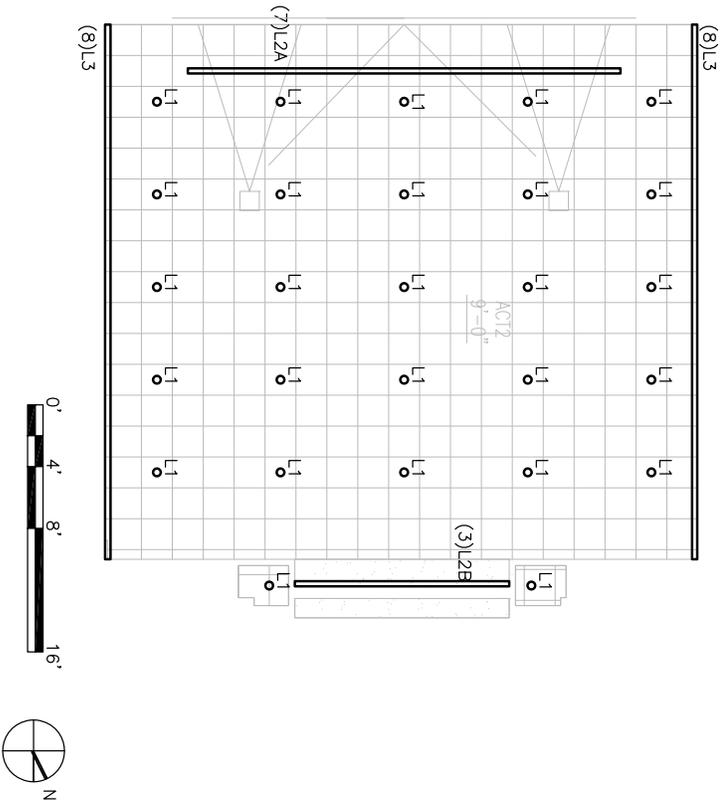
L201



1 Tisch Lobby Lighting Reflected Ceiling Plan

<p>I202</p>	<p>New York University Concourse Project New York City, New York</p>
	<p>Pennsylvania State University Architectural Engineering AE 481W/882 - Senior Thesis Project</p>
	<p>Student: Kevin C. Hsia Advisors: R.Mistrick & T.Dannerth Date: April 7, 2009</p>

Scale: 1/8" = 1'-0"
 Drawing Title:
 Tisch Lobby
 Lighting Reflected
 Ceiling Plan
 Sheet:



1 Classroom Lighting Reflected Ceiling Plan

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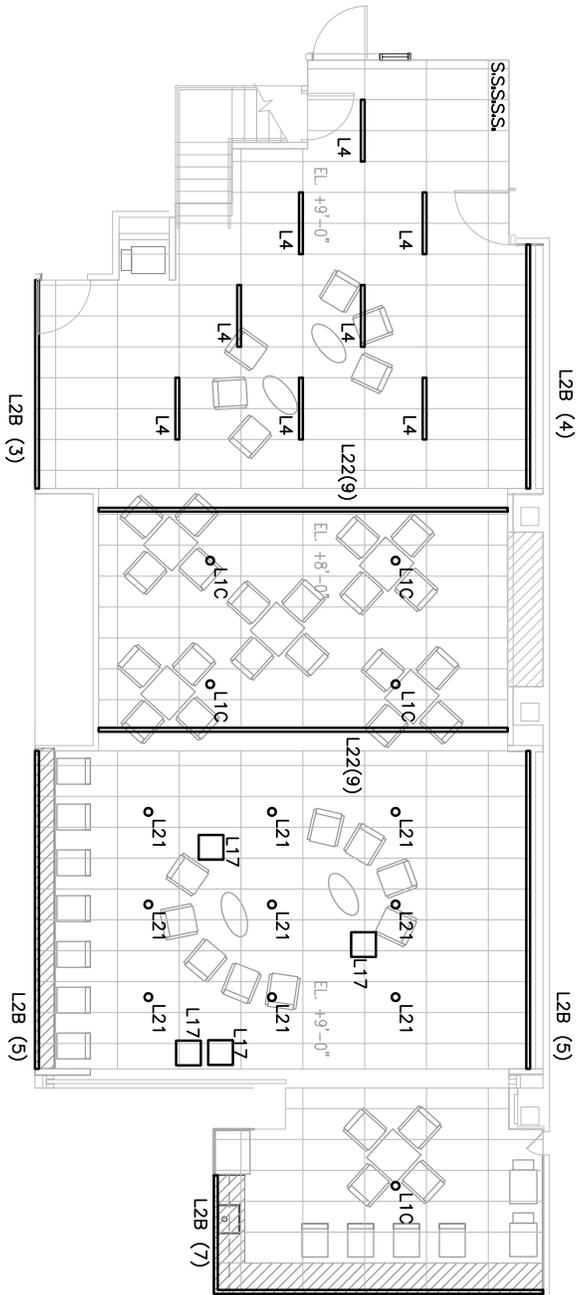
Student: Kevin C. Hsia
 Advisors: R.Mistrick & T.Dannerth

Date: April 7, 2009

Scale: 1/8" = 1'-0"
 Drawing Title:
 Classroom Lighting
 Reflected Ceiling Plan

L301

Note: L17 is not mounted to ceiling but
movable light cube.



1 MBA Student Lounge Lighting Reflected Ceiling Plan

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Pennsylvania State University
Architectural Engineering
AE 481W/882 - Senior Thesis Project

Student: Kevin C. Hsia
Advisors: R.Mistrick & T.Dannerth

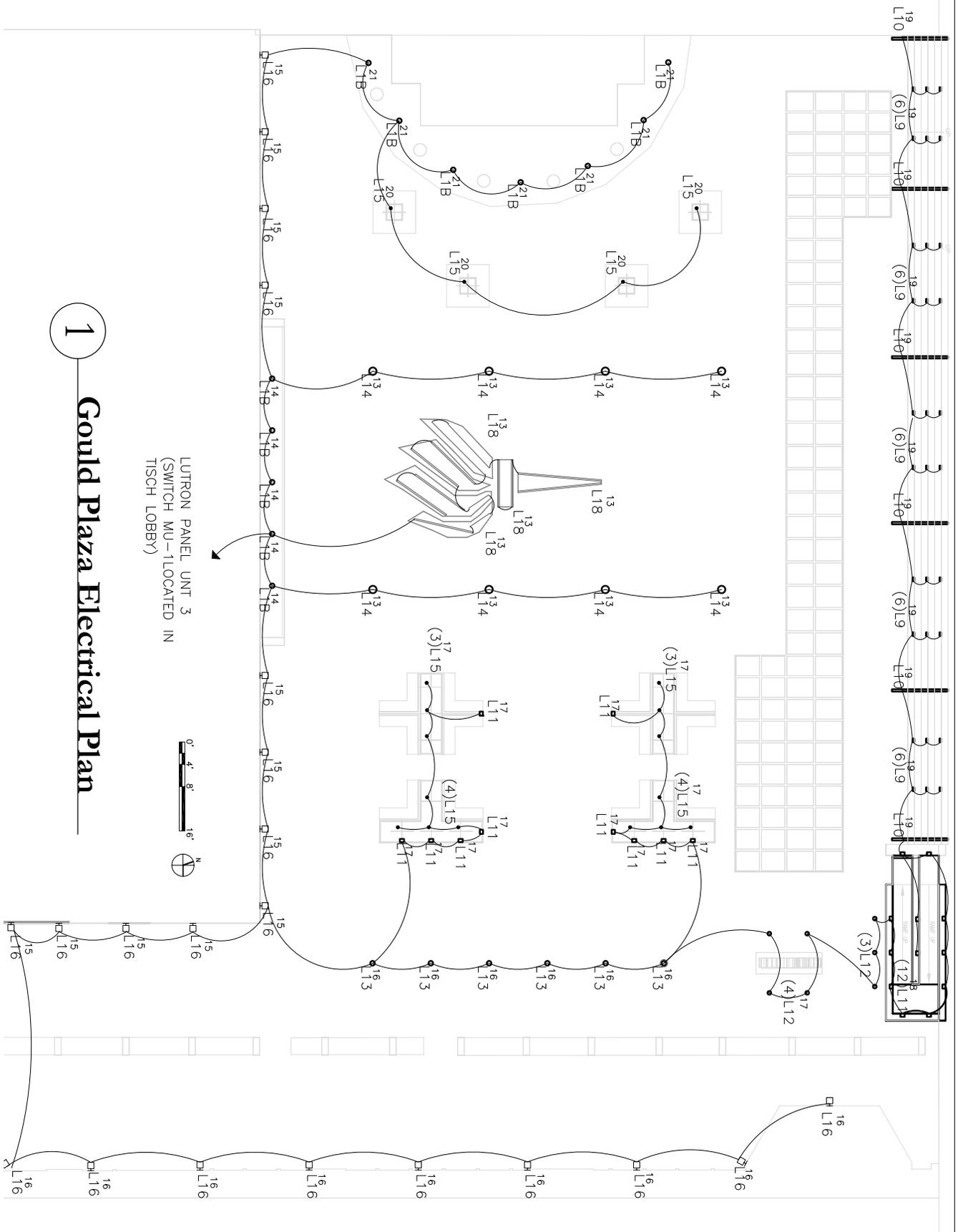
Date: April 7, 2009

Scale: 1/8" = 1'-0"

Drawing Title:
MBA Student Lounge
Lighting Reflected
Ceiling Plan

Sheet:

L401



1

Gould Plaza Electrical Plan

New York University Concourse Project

New York City, New York

Pennsylvania State University
Architectural Engineering
AE 481W/882 - Senior Thesis Project

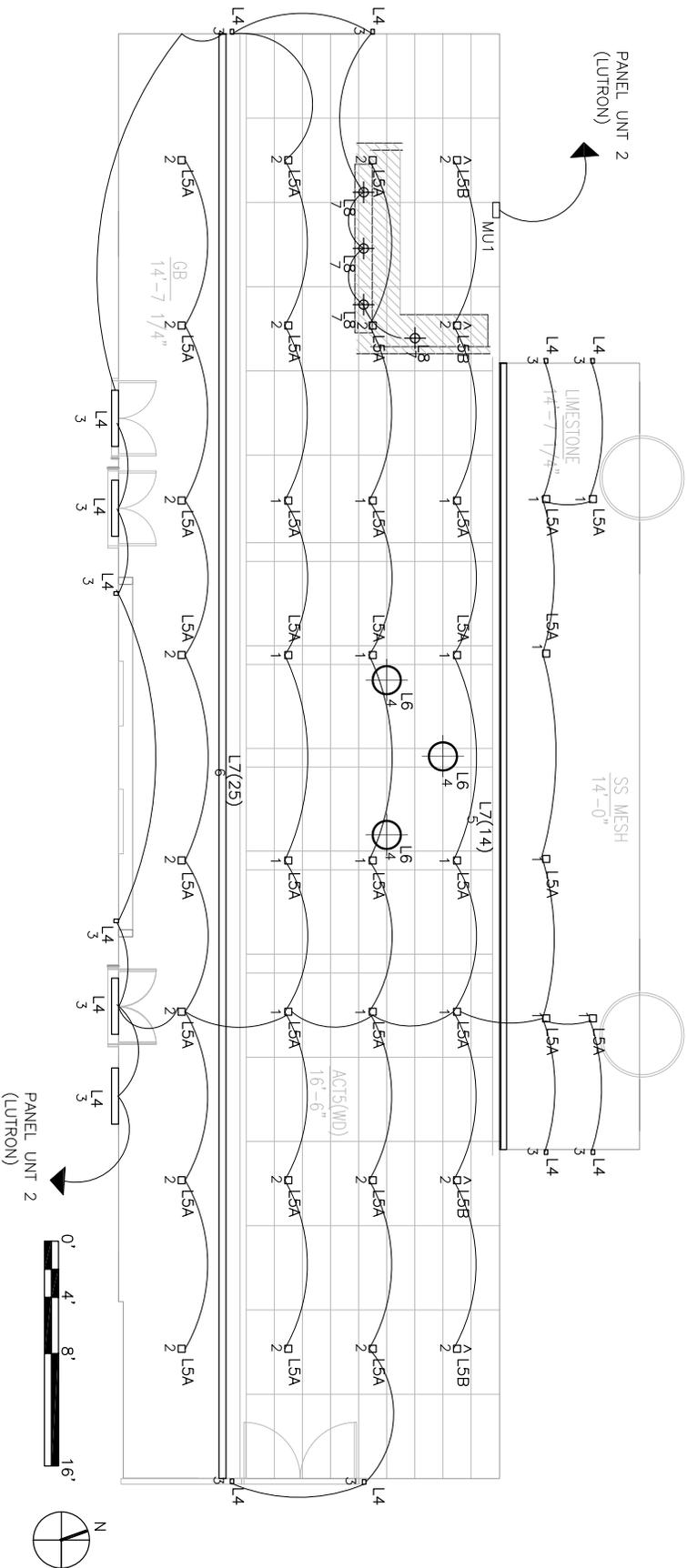
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Advisors: R.Mistrick & T.Dannerth

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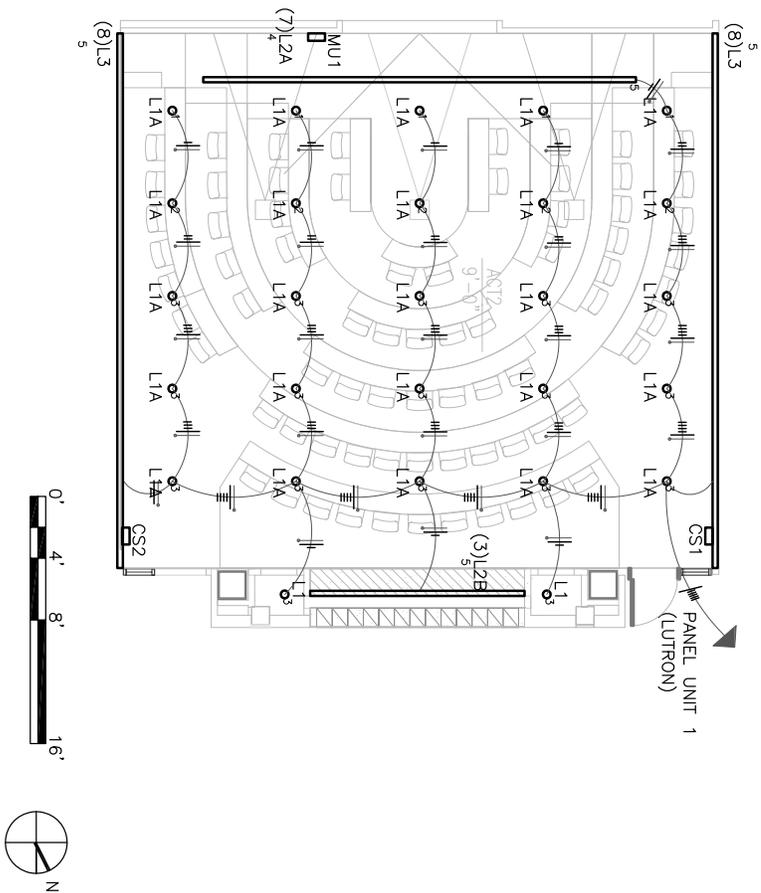
Drawing Title:
Gould Plaza
Electrical Plan

Sheet:
E101



1 **Tisch Lobby Electrical Plan**

<p>New York University Concourse Project New York City, New York</p>	<p>Pennsylvania State University Architectural Engineering AE 481W/882 - Senior Thesis Project</p> <p>Student: Kevin C. Hsia Advisors: R.Mistrick & T.Dannerth</p> <p>Date: April 7, 2009</p>	<p>Scale: 1/8" = 1'-0"</p> <p>Drawing Title: Tisch Lobby Electrical Plan</p> <p>Sheet: E201</p>
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1

Classroom Electrical Plan

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Pennsylvania State University
Architectural Engineering
AE 481W/882 - Senior Thesis Project

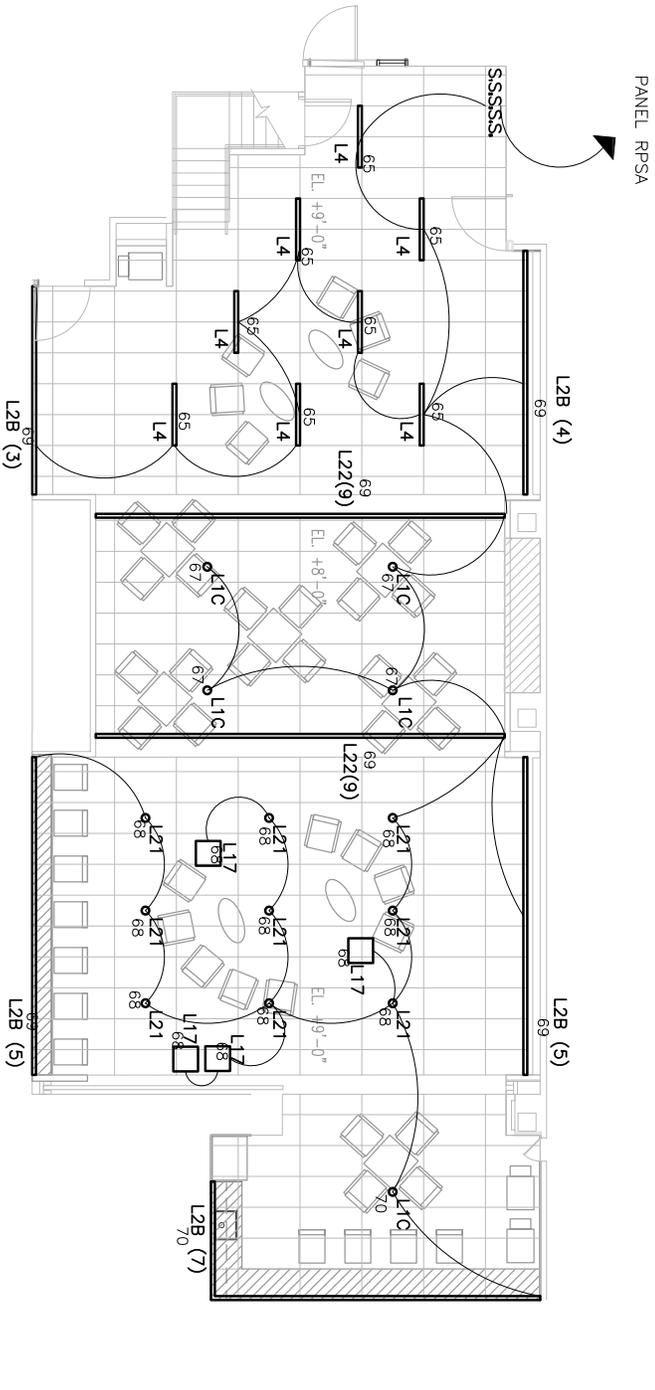
Student: Kevin C. Hsia
Advisors: R.Mistrick & T.Dannerth

Date: April 7, 2009

Scale: 1/8" = 1'-0"

Drawing Title:
Classroom
Electrical Plan

E301



1 MBA Student Lounge Electrical Plan

New York University
Concourse Project

New York City, New York

Pennsylvania State University
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Electrical Plan

Sheet:

E401